PB90-197658

Superfund Record of Decision (EPA Region 3): CryoChem, PA (First Remedial Action), September 1989

(U.S.) Environmental Protection Agency, Washington, DC

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U.S. Department of Commerce
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EPA/ROD/R03-89/078
September 1989

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EPA

Superfund Record of Decision:

CryoChem, PA

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15. Supplementary Notes

16. Abstract (Limit: 200 words)

The 19-acre CryoChem facility is a metal fabricating facility in the village of Worman, Earl Township, Berks County, Pennsylvania. The facility consists of a workshop area, a warehouse, and an office building which are all located in the southern four acres of the site. Between 1970 and 1982, Cryochem reportedly used chemical solvents to clean dye from metal welds at a rate of two to three 55-gallon drums per year. The facility also reported that a solvent spill had occurred at some unspecified time in the past. Spilled solvent is suspected to have collected in the workshop drains and flowed, through underground channels, towards a stream that flows across the site. Spilled solvent has also migrated through the soil column and has contaminated the ground water underlying the site. Ground water samples, collected between 1981 and 1985 by the State and EPA, revealed that an onsite production well, nearby residential wells, and onsite soil have been contaminated. As a result of drinking water contamination, EPA installed activated carbon filters in 13 homes in 1987. This Record of Decision, the first of two operable units, addresses the distribution of clean water to residents whose water supply is affected or potentially affected by ground water contamination. The primary contaminants of concern affecting the ground water are VOCs including TCA, DCA, TCE, DCE, and PCE. (See Attached Sheet)

17. Document Analysis a. Descriptors

Record of Decision - CryoChem, PA
First Remedial Action
Contaminated Medium: gw
Key Contaminants: VOCs (TCE, PCE)

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report) None	21. No. of Pages 89
	20. Security Class (This Page) None	22. Price A05

(See ANSI-Z39.18) *See Instructions on Reverse*

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Department of Commerce

EPA/ROD/R03-89/078
CryoChem, PA
First Remedial Action

16. Abstract (continued)

The selected remedial action for this first operable unit includes installation of dual-activated carbon adsorption units or continued maintenance of existing carbon units at affected homes until a permanent clean water supply is developed; implementation of periodic sampling at potentially affected homes; construction of a new uncontaminated water supply to serve affected and potentially affected residences and businesses; and periodic sampling of residents outside the affected area. The estimated present worth cost for this remedial action is $1,260,000 which includes annual O&M costs of $80,000.

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

CryoChem Site, Drinking Water Supply Operable Unit
Earl Township, Berks County, Pennsylvania

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for Operable Unit 1 of the CryoChem site, chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This action is based on the Administrative Record for the site.

The Commonwealth of Pennsylvania concurs with the selected remedy.

ASSESSMENT OF THE SITE

Actual releases of hazardous substances from this site have presented a substantial endangerment to the public health. If the releases of hazardous substances are not addressed by the remedy selected in this Record of Decision (ROD), the public health, welfare or the environment may continue to be endangered.

DESCRIPTION OF THE REMEDY

This Operable Unit is the first of two operable units for the site. The Operable Unit will provide a clean water supply for the residents whose ground water has been contaminated by the site.

The major components of the selected remedy include:

1. Continued operation and maintenance, until a permanent clean water supply is developed, of dual activated-carbon units installed at 13 homes affected by the CryoChem site.

2. Installation and maintenance, until a permanent clean water supply is developed, of dual activated-carbon units at homes affected by contamination from the site that are not currently equipped with carbon units.

3. Periodic chemical sampling of 13 currently unaffected homes and businesses which could potentially be affected by contamination from the site due to their location near the site.

4. Installation, operation, and maintenance of dual activated-carbon units at residential wells which become affected by contamination from the CryoChem site.

5. Development and construction of a new clean water supply well and distribution system to provide clean water to affected and potentially affected homes and businesses. The new water supply well will include treatment units if necessary.

6. Operation of a new clean water supply well and distribution system to provide clean water to affected homes and businesses.

Operable Unit 2 will address the contamination of soil and ground water at the site.

DECLARATION

This action is protective of human health and the environment, complies with Federal and State requirements applicable or relevant and appropriate to this action, and is cost-effective. This action employs permanent solutions to the extent practicable given the limited scope of the action. Subsequent response actions are planned to address each of the risks posed by the site. To the extent practicable, subsequent response actions will be consistent with the action selected in this ROD. Because this action does not constitute the final remedy for the site, the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element will be addressed at the time of the final response action, i.e., during Operable Unit 2.

Edwin B. Erickson
Regional Administrator

9/29/89
Date

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for the
Decision Summary

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A. INTRODUCTION

The CryoChem site is located in the village of Worman, Earl Township, Berks County, Pennsylvania. The site is approximately 19 acres in size although site operations are confined to the southern 4 acres. Past operations at the site involved the use of solvents when checking the integrity of metal welds. Volatile organic compounds have been detected by EPA and PADER at the site and in residential wells near the CryoChem site. The site was proposed for the National Priorities List in June 1985 based on an observed release of hazardous substances to the environment.

EPA is currently overseeing a remedial investigation and feasibility study of the site which is being conducted by potentially responsible parties. The investigation and study are currently scheduled to be completed in the fall of 1989.

Because several residential wells have become contaminated above applicable federal and state standards, carbon adsorbtion units have been installed at 13 of the most contaminated wells by EPA's Superfund removal program. EPA has separated the site into two operable units to focus on the contamination of the drinking water supply at an early stage in the remedial process.

This Record of Decision (ROD) selects a remedial alternative to ensure that clean water is supplied to residents affected or potentially affected by contamination from the CryoChem site. This ROD addresses Operable Unit 1, Drinking Water Supply. After the remedial investigation and feasibility study are completed, EPA will select a remedial alternative to address Operable Unit 2, Area Wide Ground Water and Source Area.

To the maximum extent practicable, the remedy selected for Operable Unit 2 will be consistent with the remedy selected for Operable Unit 1. In addition, the remedy selected in this ROD is flexible and can be integrated into the remedy selected for Operable Unit 2.

This decision document presents the selected remedial action for Operable Unit 1 of the CryoChem site in Earl Township, Berks County, Pennsylvania, chosen in accordance with CERCLA, as amended by SARA, and, to the extent practicable, the National Contingency Plan. The decision for this site is supported by the administrative record file for this site and by comments received by EPA during the public comment period for the proposed plan.

B. DEFINITIONS

Hazard Ranking System (HRS) - A document which assigns a score based on the relative degree of risk posed by each site. A score of 28.5 places a site on the National Priorities List.

National Priorities List (NPL) - EPA's list of the nation's top priority hazardous waste sites that are eligible to receive federal money for response action under Superfund.

National Contingency Plan (NCP) - Contains the regulations that govern the Superfund program.

Remedial Investigation (RI) - An investigation to determine the nature and extent of contamination at a Superfund site and to evaluate the risks associated with the contamination.

Feasibility Study (FS) - A study which identifies and develops remedial alternatives to address contamination at a Superfund site.

Focused Feasibility Study (FFS) - A study which identifies and develops remedial alternatives to address a specific medium or risk.

Proposed Plan - A document related to the EPA Record of Decision identifying the remedial alternative preferred by EPA.

Record of Decision (ROD) - A document identifiying the remedial alternative selected by EPA.

Maximum Contaminant Level (MCL) - The maximum amount of contaminant allowable in drinking water to minimize or eliminate dangerous health effects under the provisions of the Safe Drinking Water Act.

Cancer Risk of $1x10^{-6}$ - 1 excess cancer in one million people based on the consumption of 2 liters of water per day by a 70 kilogram (approximately 155 pounds) person with a life expectancy of 70 years.

I. Site Name, Location, and Description

The CryoChem site is located in the village of Worman, Earl Township, Berks County, Pennsylvania, approximately 3 miles west of Boyertown, Pennsylvania. The CryoChem site is approximately 19 acres in size and is situated along Route 562 in a semi-rural area of Berks County (Figure 1).

The CryoChem facility is located on gently sloping ground at the base of a forested hill with nearly 90 feet of relief to the northeast of the site. A small stream flows south across the site, through a residential area, and eventually to Ironstone Creek. Several farms and a residential area are located to the south of the site. Surface runoff from the hill behind the site is combined with shop drainage and is channeled to the small stream on the site through underground conduits.

The site consists of a workshop area (fabrication building and Quonset hut), a warehouse, and an office building all located on the southern 4 acres of the site (Figure 2).

Based upon available information, the ground water flows from northwest to southeast beneath the site and is controlled predominantly by fractures. Ground water beneath the site flows towards several residential wells in Earl and Douglass Townships.

II. Site History and Enforcement Activity

CryoChem, Inc. has been manufacturing metal products, primarily pressure vessels, at the site since 1962. The metal fabrication process included the use of a chemical solvent, Chlorethane, to wipe away dye used to check for faulty welds. Between 1970 and 1982, CryoChem reportedly used Chlorethane, which contains trichloroethane, at a rate of two to three 55-gallon drums per year.

A series of environmental samples collected between 1981 and 1985 by the Pennsylvania Department of Environmental Resources (PADER), Cryochem, Inc., and EPA have revealed the presence of trichloroethene (TCE), trichloroethane (TCA), tetrachloroethene (PCE), 1,1-dichloroethene (DCE), and 1,1-dichloroethane (DCA) in an on-site production well and in nearby residential wells. These field investigations also detected the presence of TCA in on-site soils.

In September 1987, EPA sampled water from residential wells within 1/4 mile of the site. Due to the detection of elevated levels of DCE and other compounds, EPA's removal program installed activated carbon filters in 13 homes. Figure 3 depicts residential wells currently equipped with activated carbon filters. The levels of DCE in these 13 homes exceeded the action level of 23 ug/liter set by EPA's removal program.

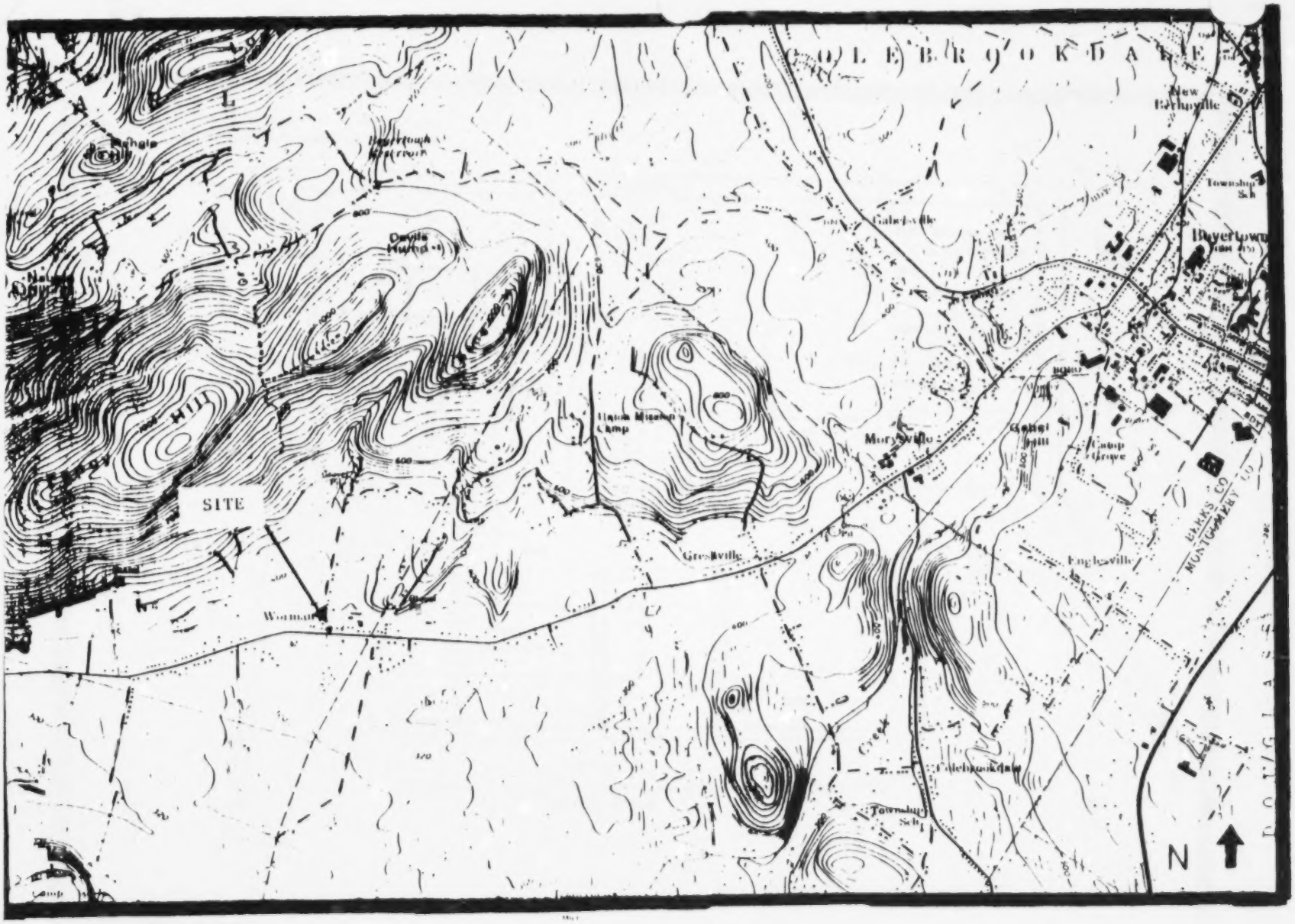


Figure 1. SITE LOCATION MAP

ROYERTOWN, PA

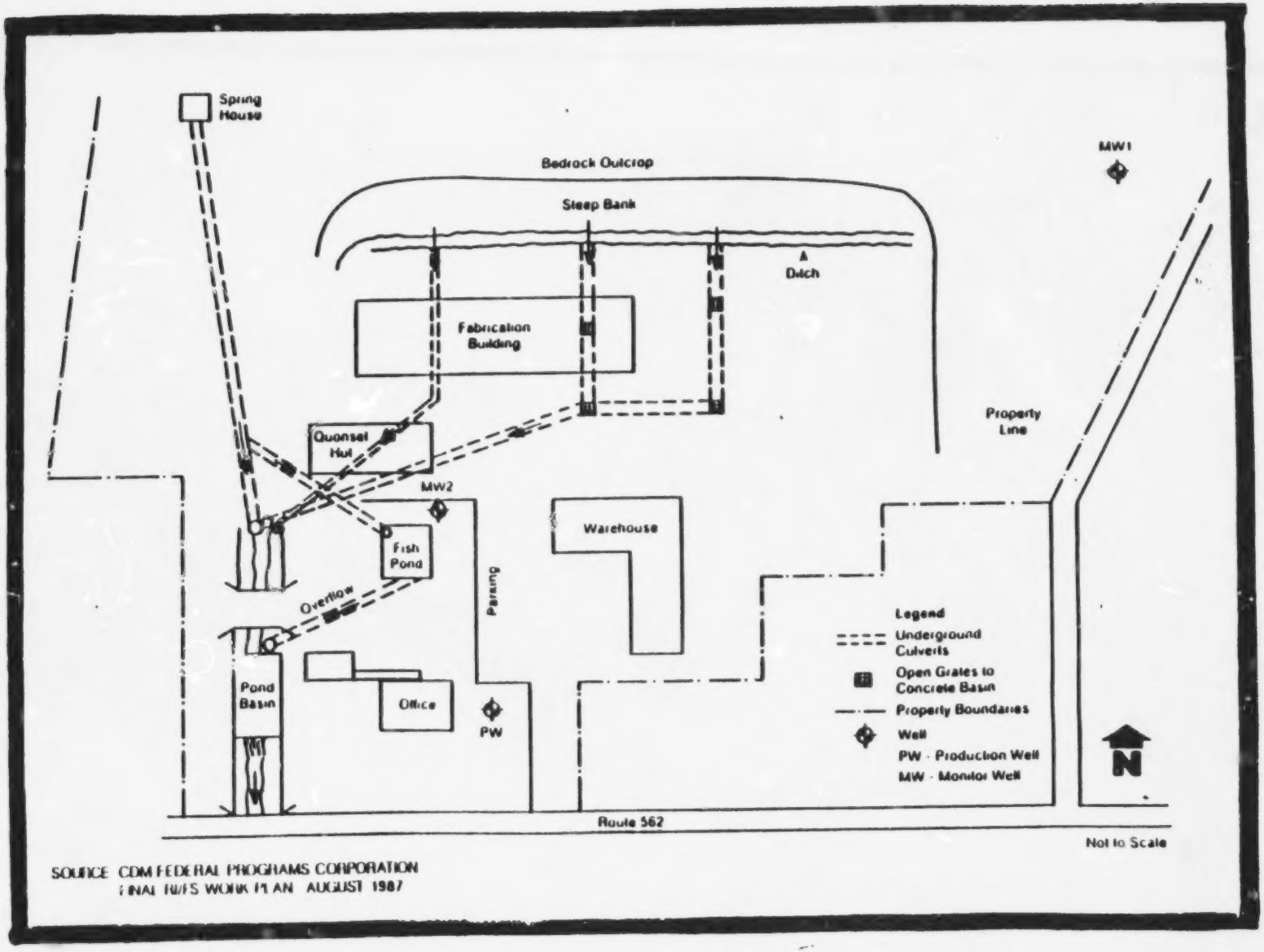
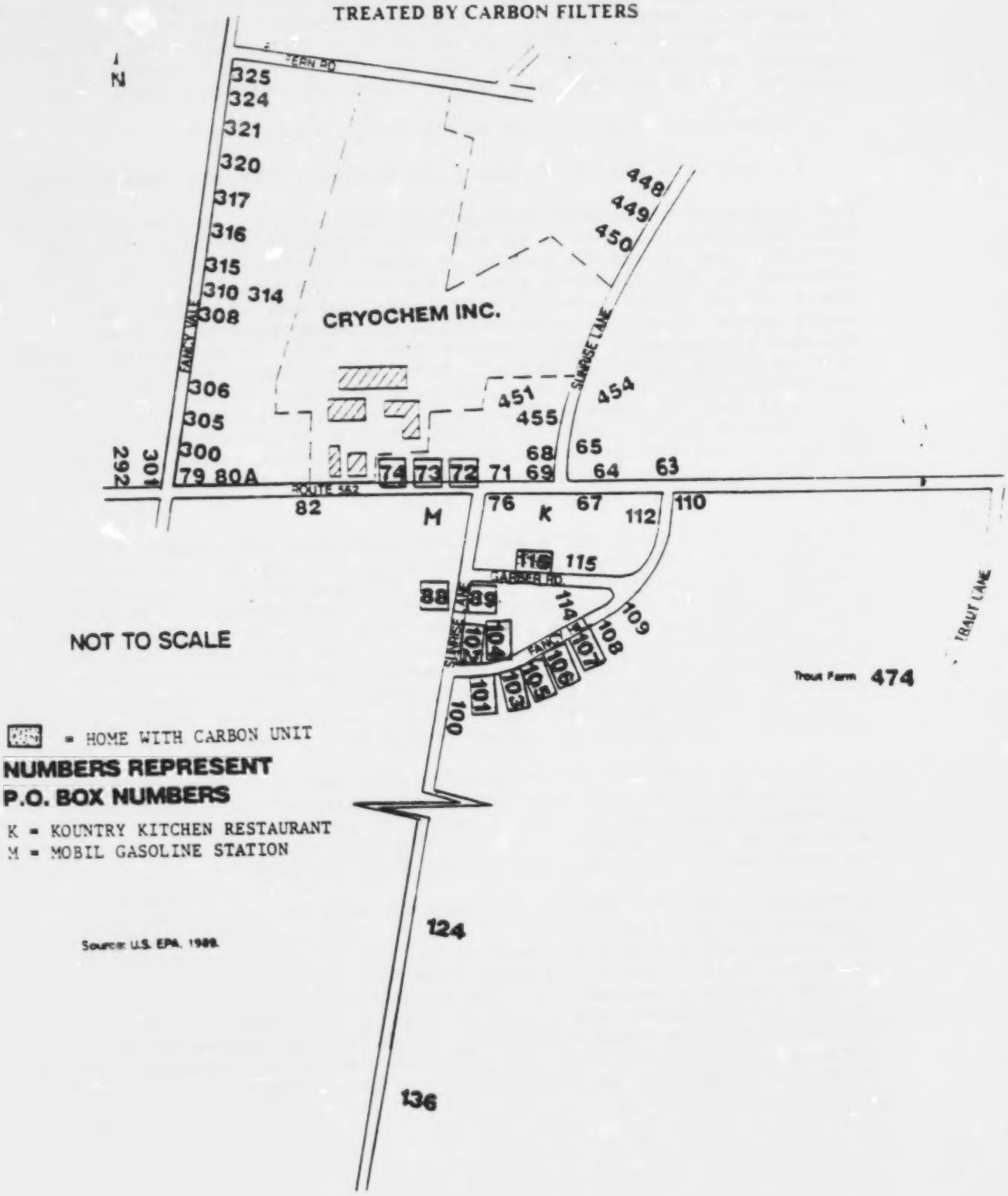

Spring House
Bedrock Outcrop
Steep Bank
MW1
Ditch
Fabrication Building
Property Line
Quonset Hut
MW2
Fish Pond
Warehouse
Overflow
Parking
Pond Basin
Office
PW
Legend
Underground Culverts
Open Grates to Concrete Basin
Property Boundaries
Well
PW - Production Well
MW - Monitor Well
N
Route 562
Not to Scale
SOURCE: CDM FEDERAL PROGRAMS CORPORATION
FINAL RI/FS WORK PLAN AUGUST 1987

Figure 2. [illegible] MAP

Figure 3.

RESIDENTIAL WELLS CURRENTLY TREATED BY CARBON FILTERS



The CryoChem site was proposed for inclusion on the National Priorities List (NPL) in June 1985 based upon an observed release of hazardous substances into the environment. The site received a Hazard Ranking System score of 28.58. To simplify and expedite remedial action at the site, EPA has divided the CryoChem site into two areas or operable units. The two operable units are:

1. Operable Unit 1 - Drinking Water Supply; and

2. Operable Unit 2 - Area Wide Ground Water and Source Area.

EPA conducted a focused feasibility study (FFS) in the spring of 1989 for Operable Unit 1 to evaluate remedial alternatives for providing an alternate supply of clean drinking water to homes affected by the CryoChem site. The FFS included the 13 homes where carbon units were already installed and an additional 7 homes where levels of contaminants exceeded an established Maximum Contaminant Level (MCL), set by EPA, or an excess cancer risk level of $1x10^{-6}$. The MCL is an enforceable drinking water standard established within the Safe Drinking Water Act. If a chemical did not have an MCL, e.g., tetrachloroethane, EPA developed a $1x10^{-6}$ level which may result in one excess cancer among one million people exposed to the contaminant. Figure 4 depicts 20 residences where remedial action levels, i.e., MCLs or $1x10^{-6}$ cancer risk levels, were exceeded.

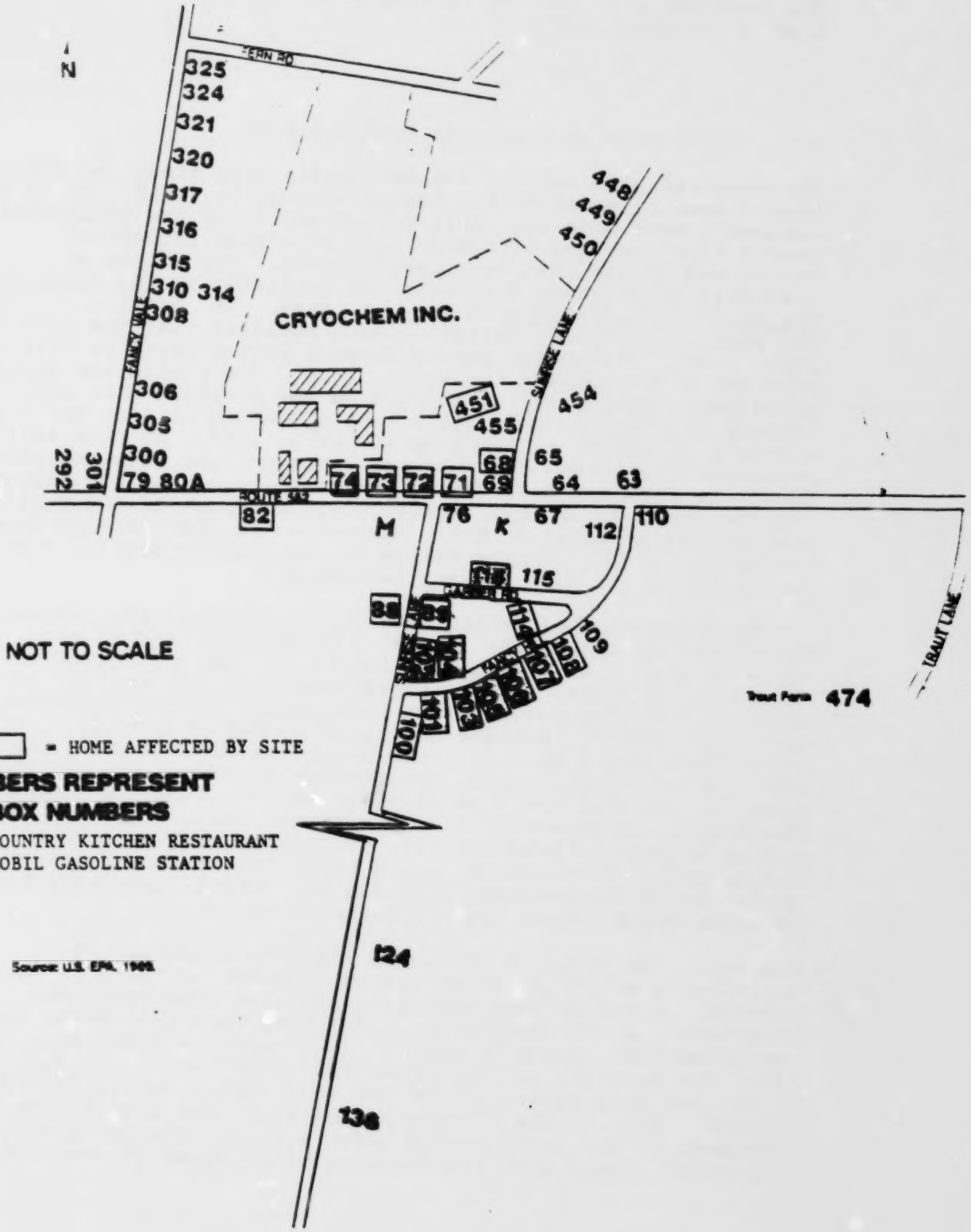
EPA prepared a proposed plan which described the remedy EPA preferred to implement for Operable Unit 1, as well as 3 other remedial alternatives. The remedy EPA preferred to implement was a connection to an existing municipal water system. The proposed plan was released to the public on July 14, 1989. After a 30-day public comment period, EPA reevaluated the 4 alternatives within the proposed plan based upon comments received from several sources. This record of decision (ROD) selects a remedial alternative for Operable Unit 1 which is different than the preferred alternative outlined within the proposed plan.

Currently a remedial investigation (RI) and a comprehensive feasibility study (FS) are being completed by the potentially responsible parties for the site which address remedial strategies for Operable Unit 2. The RI/FS for the CryoChem site is expected to be completed in the Fall of 1989.

A "special notice" letter was sent to each of the potentially responsible parties on July 14, 1989. The letters indicated that EPA would not begin the remedial design or remedial action for Operable Unit 1 until 120 days from the date of the special notice letter provided that the potentially responsible parties agreed to implement the remedial design and remedial action. The potentially responsible parties, while having expressed an interest in implementing the remedial design and remedial action, have not responded to the special notice letter with a specific offer to do so.

Figure 4.

RESIDENTIAL WELLS EXCEEDING
REMEDIAL ACTION LEVELS



The CryoChem site will be finalized on the National Priorities List in October, 1989.

III. Highlights of Community Participation

The proposed plan and the focused feasibility study for Operable Unit 1 were released to the public on July 14, 1989. These two documents were made available to the public in the administrative record file for this site and the information repository maintained at the Earl Township Building. The notice of availability of these documents was published in The Mercury and The Reading Times/Eagle on July 14, 1989. In addition, a copy of the proposed plan was mailed to each resident near the site in July, 1989. The 30-day public comment period began on July 14, 1989 and was concluded August 14, 1989. The public was given additional opportunity to comment on the proposed plan and focused feasibility study at a public meeting held at the Earl Township Municipal Building on August 9, 1989. At this meeting representatives from EPA answered questions and received comments about the site and the remedial alternatives under consideration, and the proposed remedy. A stenographic report of the public meeting was prepared by EPA. A response to the comments received during the 30-day comment period is included as part of this ROD in the Responsiveness Summary (APPENDIX A).

A significant number of the comments received by EPA contained objections to the remedy initially proposed by EPA in the proposed plan. Many of the residents and the Borough of Boyertown expressed their reservations about the quality of water made available by a water line connection into the Boyertown municipal system. Because the total number of service connections would be relatively small and the length of the dead-end line relatively large, the Borough expressed concern that the water in the line would be sluggish and would become stagnant. The Borough of Boyertown also questioned the ability of the system to provide adequate fire protection and its lack of flexibility. Furthermore, the Borough felt that the cost estimates in the proposed plan did not include necessary design features which caused the estimates to be low.

Residents who would be connected into the extension of Boyertown's municipal water system objected to the high cost of service. Although some residents near the site felt that Alternative 2, Connection to an Existing Municipal Water Supply, was an adequate means to supply clean water to homes near the site, the majority of the commentors indicated an unwillingness to pay for this water service and felt that a better alternative existed. Many of the residents indicated that Alternative 3, Treatment of the Contaminated Water with Air Stripping or Carbon Adsorption, would suit the drinking water needs of the homeowners

and assist with the cleanup of the site.

The index for the administrative record, upon which this decision document is based, is contained within APPENDIX C. This decision document is also based upon comments contained within a stenographic report of the public meeting on August 9, 1989 and other comments received by EPA, which are also included in the site file.

IV. Scope and Role of Operable Unit 1

This record of decision (ROD) addresses the first of two operable units and two planned remedial actions at the site. The ROD for this operable unit addresses drinking water and the provision of an alternate water supply for homes affected and potentially affected by the site. Figure 5 depicts 33 homes affected or potentially affected by contamination from the CryoChem site based upon chemical analyses of drinking water or proximity to other affected homes and to the site. The ROD for the second operable unit will address the remediation of all media contaminated by the site. The contamination of the drinking water aquifer beneath the site poses the principal threat to human health via contamination of residential wells.

The primary objective of this response is to supply clean water to residents living near the CryoChem site. The water supply must meet federal and state standards and must be able to satisfy present and future water needs. The response will address distribution of clean water to residents whose water supply is affected or potentially affected by contamination from the site.

The remedy described in this ROD is only part of the total remedy for the site. The remainder of the site is being investigated as part of a remedial investigation and feasibility study, the results of which will be presented at a later date and used to select a remedy for the entire site. The remedial alternative selected in this ROD is adaptable and can be integrated into the remedy selected for the entire site.

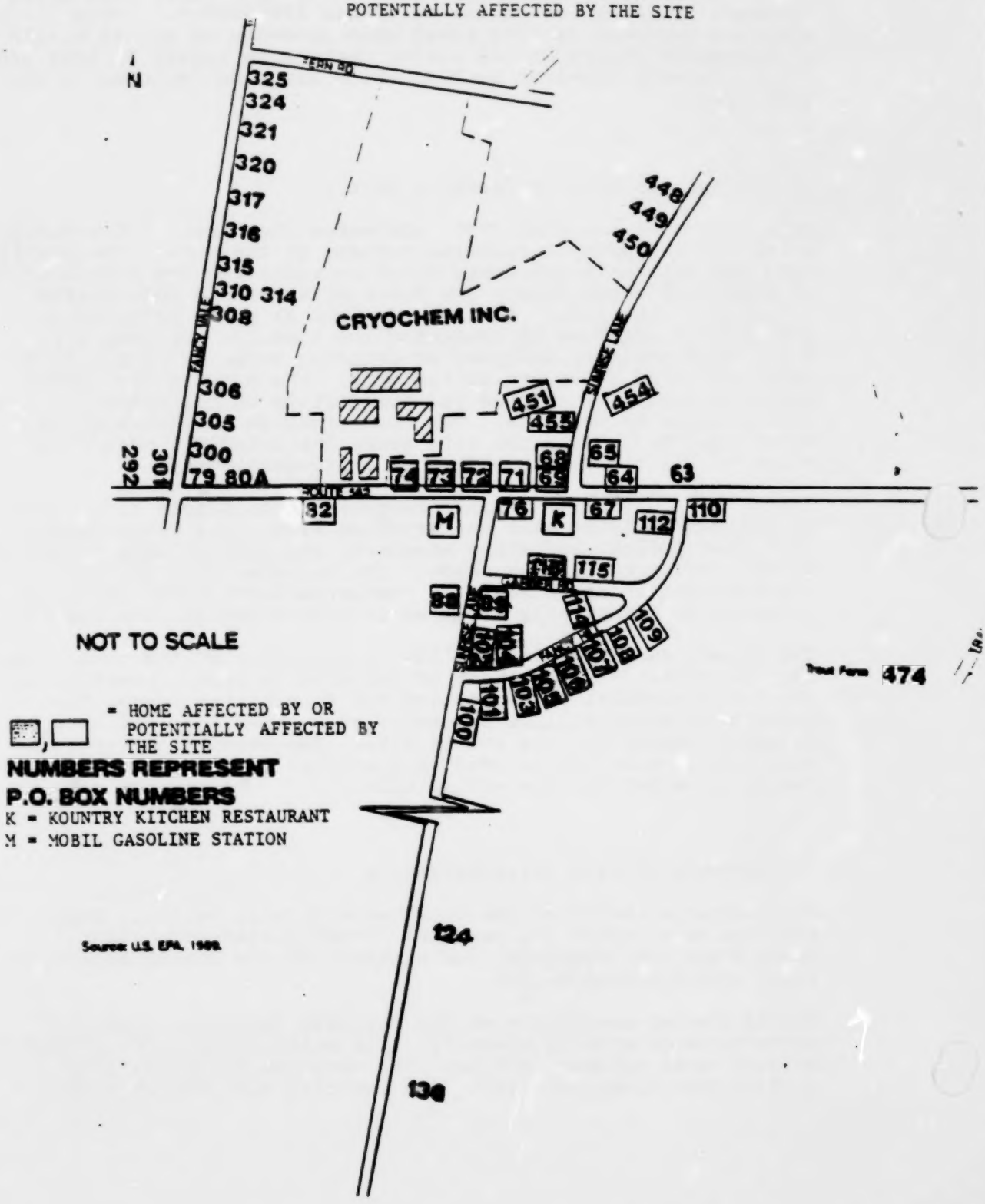
V. Summary of Site Characteristics

All characteristics of the CryoChem site will be fully described and discussed after the remedial investigation and feasibility study have been completed and a report of the investigation and study are approved by EPA.

During former operations at the CryoChem facility, chemical solvents were used to clean dye from metal welds. The amount of solvent used between 1970 and 1982 amounted to approximately 2 to 3 55-gallon drums per year. The facility also reported that a

Figure 5.

RESIDENTIAL WELLS AFFECTED OR
POTENTIALLY AFFECTED BY THE SITE



spill of solvent had occurred at some unspecified time in the past. Spilled solvent would have collected in the shop drains and flowed, through underground channels, towards an unnamed stream which flows across the property. Trichloroethane, a component of the chemical solvent used at the facility, has also been detected in the soils at the CryoChem site.

The amount of solvent spilled or otherwise released into the environment at the CryoChem site is unknown. However, some of the chemical solvent has migrated through the soil column and has entered the ground-water system beneath the facility. Chemical sampling of ground water from wells on the CryoChem site and from wells near the CryoChem site indicate that volatile organic chemicals, including trichloroethane, exist in the ground water.

The bedrock beneath the CryoChem site consists of fractured quartzite and crystalline limestone. Ground water moves predominantly through the fracture system. Therefore, residential or other wells penetrating the same fractures or fracture systems containing ground water contaminated from the CryoChem site may themselves become contaminated. Some residential wells are now contaminated by volatile organic chemicals similar to those found at the CryoChem site, including trichloroethane. EPA has installed dual activated carbon units in 13 homes with the highest levels of contaminants to reduce levels of volatile organic chemicals to safe levels, but contamination exists at other homes as well. Thus, EPA has decided to develop and screen remedial alternatives to provide a permanent supply of clean water to residences near the site and to select a remedial alternative for an alternate supply of drinking water in this Record of Decision.

VI. Summary of Site Risks

Volatile organic compounds have been detected in residential wells near the CryoChem site. The five compounds posing the greatest risk to ground water users near the site are tetrachloroethene (PCE), trichloroethene (TCE), 1,1-dichloroethene (DCE), trichloroethane (TCA) and, 1,1-dichloroethane (DCA).

The MCL, or Maximum Contaminant Level, is an enforceable drinking water standard established within the Safe Drinking Water Act. EPA will initiate a remedial action if ground water contains a particular chemical above the standard, or MCL, for that chemical. If an MCL has not been developed for a particular chemical, EPA will use other criteria when considering the need for remedial action. For this operable unit, EPA has used an "excess cancer risk level of $1x10^{-6}$" criterion, i.e., one excess cancer in one million people, to determine if remedial action is necessary. The criteria, i.e., remedial action levels, used by EPA which would trigger the need for remedial action for this

operable unit are described in Table 1.

A summary of analytical data from residential wells is contained within APPENDIX B. Table 2 depicts the levels of volatile organic chemicals found in 13 homes near the site where carbon units have been installed. Table 3 depicts the levels of volatile organic chemicals in 7 additional homes near the site. Tables 2 and 3 also compare the levels of volatile organic chemicals found in the 20 homes to the criteria established by EPA. The MCL or $1x10^{-6}$ level has been exceeded for at least one of the chemicals at 20 homes near the CryoChem site. Therefore, remedial action is justified.

VII. Documentation of Significant Changes

The proposed plan was released for public comment on July 14, 1989 and described 4 alternatives for addressing the drinking water contamination at homes near the CryoChem site. The proposed plan identified Alternative 2, Connection to an Existing Municipal Water Supply, as the preferred alternative. During the public comment period, EPA received several comments objecting to the quality of the water supplied by the Boyertown municipal water system, the time to implement the proposed alternative, and the cost of the proposed alternative.

The Borough of Boyertown believed that the quality of the water delivered through the long dead-end water line to affected residents may be poor. Because the length of the water main was relatively long and the number of service connections relatively small, the Borough felt that the water would stagnate and become dirty before it was used by residents. The Borough of Boyertown also suggested that the capacity of their water system might be overly stressed by the new connections near the CryoChem site and by other future connections.

The Borough of Boyertown also questioned the ability of the proposed extension of the water system to provide adequate fire protection for residents and questioned the flexibility of the proposed alternative, e.g., could the new water system accommodate new development along the main line. In addition, the Borough of Boyertown expressed concern that EPA's cost estimate of Alternative 2 may not have considered significant conditions which could affect the total cost, e.g. topography, causing the cost estimates in the proposed plan to be low. As a result of these and other public concerns, EPA has reevaluated the four alternatives and has selected a combination of Alternative 3, Treatment of Contaminated Water, and Alternative 4, Development of a New Uncontaminated Water Supply, as the remedy for this operable unit.

During the public comment period the cost figures for each alternative were revised to include 11 additional homes and 2

TABLE 1
REMEDIAL ACTION LEVELS

Contaminant	Remedial Action Level (ug/L)
1,1,1-Trichloroethane (TCA)	200[a]
Trichloroethene (TCE)	5[a]
Tetrachloroethene (PCE)	0.66[b]
1,1-Dichloroethene (DCE)	7[a]
1,1-Dichloroethane (DCA)	0.38[b]

Notes:

[a] Maximum contaminant level.
[b] Concentration that poses a 10^{-6} cancer risk (one cancer per one million people exposed).

TABLE 2

COMPARISON OF REMEDIAL ACTION LEVELS AND ANALYTICAL DATA FOR 13 RESIDENTIAL WELLS WITH CARBON FILTERS – SAMPLES COLLECTED IN MARCH 1989

Address P.O. Box	Concentration in Residential Well (µg/L)				
	1,1,1-Trichloroethane (TCA)	Trichloroethene (TCE)	Tetrachloroethene (PCE)	1,1-Dichloroethene (DCE)	1,1-Dichloroethane (DCA)
	MCL: 200	MCL: 5	10^{-6} = 0.66[a]	MCL: 7	10^{-6} = 0.38[a]
72	369	16	7	99	26
73	460	14	6	132	35
74	ND	ND	ND	ND	ND
88	28	8	3	64	13
89	143	5	2	39	8
101	161	5	2	34	8
102	197	6	2	42	10
103	157	5	2	38	9
104	129	5	2	28	8
105	158	ND	2	32	8
106	175	6	2	43	9
107	196	6	3	43	10
116	65	3	1	18	5

Notes:

ND = Not detected.

[a] Concentration that poses a cancer risk of 10^{-6} (one cancer per one million people exposed).

Analytical results in this table are for samples collected prior to treatment with in-house carbon filters.

Source: U.S. EPA, CryoChem Ground-Water Site, Analytical Results Summary, Residential Well Sampling. April 8, 1989. (This document is a computer printout that summarizes analytical data collected between July 1987 and March 1989.)

TABLE 3

COMPARISON OF REMEDIAL ACTION LEVELS AND ANALYTICAL DATA FOR SEVEN ADDITIONAL RESIDENTIAL WELLS – SAMPLES COLLECTED IN 1987

Address (PO Box)	Date Sampled	Concentration in Residential Well (µg/L)				
		1,1,1-Trichloroethane (TCA)	Trichloroethene (TCE)	Tetrachloroethene (PCE)	1,1-Dichloroethene (DCE)	1,1-Dichloroethane (DCA)
		MCL = 200	MCL = 5	10^{-6} = 0.66[a]	MCL = 7	10^{-6} = 0.38[a]
68	7/27/87	ND	ND	ND	ND	7
	9/15/87	8	ND	ND	5	11
71	7/27/87	7	ND	ND	1	ND
	9/15/87	10	ND	1	7	ND
82	9/15/87	41	1	1	36	2
100	7/28/87	16	ND	ND	2	ND
	9/15/87	8	ND	ND	16	ND
108	7/27/87	33	ND	ND	9	1
	9/15/87	31	2	1	5	64
114	7/27/87	4	ND	ND	ND	ND
	9/15/87	7	ND	1	3	ND
451	7/27/87	2	ND	ND	ND	2
	9/15/87	ND	ND	ND	ND	ND

Notes:

ND = Not detected

[a] Concentration that poses a cancer risk of 10^{-6} (one cancer per one million people exposed).

Source: U.S. EPA, CryoChem Ground Water Site, Analytical Results Summary, Residential Well Sampling. April 8, 1989. (This document is a computer printout that summarizes analytical data collected between July 1987 and March 1989.)

businesses which potentially could be affected by the CryoChem site. These cost figures have been summarized in Table 4 and have been considered, along with other criteria and issues discussed above, in the selection of the remedy for Operable Unit 1.

The remedy for Operable Unit 1 includes treatment and/or sampling of 33 homes and businesses. This ROD selects carbon treatment units for each of 20 homes affected, but not already equipped with such units, by the CryoChem site as part of the remedy for this operable unit. A residence is considered to be affected if levels of volatile organic chemicals in the drinking water supply exceed EPA's remedial action criteria. For this site, EPA's remedial action criteria are Maximum Contaminant Levels for trichloroethene (TCE), 1,1-dichloroethene (DCE), and 1,1,1-trichloroethane (TCA) and $1x10^{-6}$ cancer risk levels for tetrachloroethene (PCE) and 1,1-dichloroethane (DCA). The dual activated carbon units would be installed and maintained until a long-term clean water supply has been developed and affected homes are connected.

The remedy for Operable Unit 1 also includes periodic, e.g., quarterly, sampling of drinking water at 11 additional homes and 2 businesses, which potentially could be affected by the CryoChem site due to their location. These homes would be sampled until a long-term clean water supply is developed and the potentially affected homes are connected. If any of the 13 additional sampling points should become contaminated above the MCL or $1x10^{-6}$ cancer risk level for any of the contaminants associated with this site before a clean water supply is developed, a carbon unit would be installed on the affected drinking water supply.

In addition, this remedy includes periodic sampling of additional homes, which are not affected or potentially affected by contamination from the CryoChem site. Additional homes would be included in a sampling program if analytical data from any of the 33 homes addressed in this ROD suggests that additional homes may require sampling to ensure that public health is protected.

The installation of carbon units at affected homes and the periodic sampling of other homes is considered to be an interim measure until a permanent clean water supply system has been developed. The installation of dual activated carbon units at affected homes is the quickest, easiest and most adaptable remedy to implement, which is protective of human health, until the new water supply is developed. This alternative was favored by much of the public.

This ROD also provides for the concurrent development of a new uncontaminated water supply for residents near the site. After a new water supply well has been drilled, or an existing suitable well located, a pump would be installed and a distribution system would be constructed to supply clean water to affected and potentially affected residents on a long-term basis. This

TABLE 4

REMEDIAL ALTERNATIVES COST SUMMARY
(31 RESIDENCES AND 2 BUSINESS)

	ALTERNATIVE	CAPITAL COST	ANNUAL O&M	PRESENT WORTH
1.	No Action	----	-----	----
2.	Connection to an Existing Municipal Water Supply	$ 950,000	$ 21,000	$ 1,100,000
3.	Treatment of the Contaminated Water			
	A- Central Well with Air Stripper	$ 480,00	$ 26,000	$ 720,000
	B- Central Well with Carbon Unit	$ 520,000	$ 53,000	$ 1,000,000
	C- In-House Carbon Units	$ 57,000	$ 60,000	$ 620,000
4.	New Uncontaminated Water Supply	$ 450,000	$ 20,000	$ 640,000

alternative may be developed further into part of a permanent remedy for the CryoChem site selected in the ROD for Operable Unit 2.

The combination of alternatives selected in this ROD may be implemented before the RI/FS for Operable Unit 2 is completed and the remedy for the entire site is chosen. The remedy selected in this ROD is adaptable and can be designed, if necessary, to be integrated into the permanent remedy for the entire site, which will be selected in the ROD for Operable Unit 2.

VIII. Alternatives

This section of the ROD describes the process of screening and developing remedial alternatives and discusses in detail each of the four alternatives evaluated in the proposed plan.

A. Screening of Alternatives

Table 5 identifies each of the remedial technologies and management or process options which were screened in the focused feasibility study and considered in the development of remedial alternatives. The significance of the screening exercise is to determine which technologies and options can best satisfy the primary objective, i.e., to provide a clean water supply. Each of the technologies and options are evaluated on the basis of their effectiveness and their ability to be implemented considering site-specific conditions. Only those measures which can be used to provide clean water to residents near the CryoChem site were evaluated and further developed into remedial action alternatives. Remedial action alternatives identified are limited to proven technologies and process options which have been used successfully at other sites.

B. Description of Alternatives

Based upon the screening and evaluation of potentially applicable remedial technologies and management or process options and the requirement within the National Contingency Plan to evaluate a "No Action" alternative, the following remedial action alternatives have been selected for further development and detailed evaluation:

1. No Action
2. Connection to an Existing Municipal Water Supply
3. Treatment of the Contaminated Water
4. Development of a New Uncontaminated Water Supply

TABLE 5

SUMMARY OF PRELIMINARY SCREENING OF REMEDIAL ACTION PROCESS OPTIONS
(Page 1 of 2)

General Remedial Actions	Process Options	Descriptions	Comments
No Action	None	Remove temporary activated carbon systems. Residents would be required to drink contaminated water or obtain alternate supply.	Not applicable. Presents a threat to human health through consumption of contaminated water.
Connect to Existing Supply	Connection to Boyertown Municipal Supply	Install new piping, connect to Boyertown municipal supply, and distribute new water supply to homes.	Potentially applicable.
Develop New Uncontaminated Water Supply	Surface Water Supply	Identify uncontaminated surface water supply and distribute to homes.	Surface water in area is contaminated. Adequate surface water supply is not available.
	New Well Outside Plume of Contamination	Install new well outside plume of contamination. Distribute water to homes without treatment.	Potentially applicable.
	Existing Well Outside Plume of Contamination	Use existing well on C.S. Garber & Sons property to supply water to homes.	May not be outside plume. Additional casing of well required.
	New Wells in Deeper Aquifer	Drill a new well at each home through zone of contamination into a deeper aquifer.	Vertical extent of contamination not known. Aquifer characteristics have not been evaluated. Wells may cross-contaminate aquifers.
Treat Contaminated Water From Existing Wells	Activated Carbon Systems	Maintain individual activated carbon systems at each home. Contaminated water passes through a column of activated carbon where organic contaminants adsorb on carbon surface.	Potentially applicable.

SUMMARY OF PRELIMINARY SCREENING OF REMEDIAL ACTION PROCESS OPTIONS
(Page 2 of 2)

General Remedial Actions	Process Options	Descriptions	Comments
Treat Contaminated Water From New Well	Air Stripping	Extract water from new well in the plume of contamination, mix with air in a packed column to promote transfer of volatile organic compounds from water to air, and distribute to homes.	Potentially applicable
	Steam Stripping	Extract water from new well in the plume of contamination and treat by steam stripping. Similar to air stripping except steam is pumped into stripping column to add heat and promote the transfer of less volatile organic compounds.	More costly and difficult to implement than air stripping. Additional effectiveness provided not required at this site.
	Activated Carbon System	Extract water from new well in the plume of contamination, pass it through a column of activated carbon, and distribute it to homes.	Potentially applicable
Blend Contaminated and Uncontaminated Water	Water from Existing Wells Blended with Water From New Well	Blend water from a new well outside the plume of contamination with water from contaminated wells to dilute contaminants to acceptable concentrations.	Excessive monitoring required to ensure acceptable water quality.

ALTERNATIVE 1 - No Action

The National Contingency Plan (NCP) requires that EPA consider a "No Action" alternative for each site. This alternative does not supply an alternate water supply for affected homes near the CryoChem site and does not provide for sampling to ensure that other homes are not affected. Activated carbon filters already installed at homes by EPA would be removed if this alternative were selected. As a result, residents near the site would drink and utilize water contaminated with volatile organic compounds from the site. Because volatile organic compounds exist at levels above the MCL and/or cancer risk level of $1x10^{-6}$, public health would not be protected under the "No Action" alternative. Alternative 1 does not satisfy the primary objective of this ROD.

ALTERNATIVE 2 - Connection to an Existing Municipal Water Supply

The general components of this alternative are:

A. Connecting affected and potentially affected homes into an extension of the Boyertown municipal water system.

B. Removing existing carbon units from affected homes.

C. Abandoning affected and potentially affected wells within the plume of contamination and/or implementing institutional controls on the development and use of private wells within the plume of contamination.

D. Conducting periodic sampling and monitoring at homes not connected into the Boyertown system to ensure that these homes do not become affected by contamination from the site.

The Borough of Boyertown operates a municipal water supply system. Although the homes with contaminated water supplies are outside the Borough boundaries, they could be connected to an extension of the Borough's water system. The nearest point of interconnection to Boyertown's water system is approximately 3.5 miles east of the CryoChem site near Route 562.

Extending water service from Boyertown to the residents near the CryoChem site would require approximately 4 miles of minimum 4-inch diameter water main. Due to the length of the water main, topography, and probable pressure losses, at least one booster pump station would be required. The project would be technically feasible and implementable, but would take the longest time and would be the most difficult of the alternatives to implement. An

agreement would have to be arranged between the Borough of Boyertown and the party implementing this alternative to fund, operate and maintain the water line.

Extra storage capacity at the end of the water line extension may be necessary to provide fire protection commensurate with that received by other Borough residents and to provide water service while the main is being repaired. Extra storage capacity was not considered in the FFS. This alternative does not provide additional fire protection, i.e., more protection than residents currently have. This alternative does not include provisions for additional system capacity to serve new development in the area not affected or potentially affected by the site.

Alternatively, the dead-end water line could be looped, i.e., connected back into the main water line network at a different location, to enable the Borough to supply water while the line is being repaired. A "loop" feature was not considered in the design of Alternative 2.

After homes are connected to the municipal system, the private wells which could act to exacerbate the spread of contaminants within the affected or potentially affected area should be plugged and abandoned to prevent the further spread of the contamination through the well bore. This alternative would provide no additional protection of the environment and downgradient users of ground water unless significant pathways for contaminant migration, such as private wells, are sealed. After the alternative is implemented, further construction and pumping of private wells within the plume area must be controlled.

The Borough of Boyertown has procedures for review of plans to extend their water system. These review procedures would be followed. The Borough would routinely sample their water to ensure that all criteria identified within the Safe Drinking Water Act, e.g., MCLs, and criteria within Pennsylvania's Safe Drinking Water Regulations are met.

The costs for this alternative are presented in Table 6. The costs assume that each of the 33 homes and businesses affected or potentially affected by contamination from the CryoChem site would be connected into the water main.

ALTERNATIVE 3 - Treatment of the Contaminated Water

Under this general alternative, two treatment technologies and two management or process options have been considered by EPA. The treatment technologies are air stripping and carbon adsorption. The management or process options are treatment and distribution from a central well and treatment at individual private wells. The various technologies and options have been developed into three specific alternatives. The options under Alternative 3 are:

TABLE 6

ESTIMATED COST TO CONNECT TO BOYERTOWN MUNICIPAL SYSTEM

	Capital	Annual O&M
Force Main	$450,000	
House Service and Meters	67,000	
Booster Pump Station	50,000	$14,000
Electrical Service	10,000	
Miscellaneous	10,000	
Connection Fees	25,000	
Water Use Charges		7,000
In-House Carbon System Removal	6,000	———
	$620,000	$21,000
Bid Contingency (15%)	93,000	
Scope Contingency (10%)	62,000	
Construction Subtotal	$770,000	
Permitting and Legal (5%)	$ 39,000	
Engineering Design (10%)	77,000	
Service During Construction (8%)	62,000	
Total Capital Cost	$950,000	

Present worth at 10% discount rate and 30 years.

$1,100,000

Alternative 3A - Treatment by Air Stripping and Distribution from a Central Well within the Plume

Alternative 3B - Treatment by Carbon Adsorption and Distribution from a Central Well within the Plume

Alternative 3C - Treatment by Carbon Adsorption at Individual Private Wells

The general components of Alternative 3, option 3A, are:

A. Installing, operating and maintaining an air stripper to remove volatile organic chemicals from ground water withdrawn from a central well.

B. Connecting affected and potentially affected homes to a water distribution system fed by water cleaned by the air stripper.

C. Removing activated carbon units from affected homes.

D. Abandoning affected and potentially affected private wells and/or implementing institutional controls on the development and use of private wells within the plume of contamination.

E. Conducting periodic sampling of the air stripper water discharge and air stream to ensure that all standards are met.

F. Conducting periodic sampling and monitoring at homes not connected to the new water system to ensure that these homes do not become affected by contamination from the site.

The general components of Alternative 3, option 3B, are similar to those for Alternative 3, option 3A, except that carbon adsorption units, and not an air stripper, will be used to treat contaminated ground water.

The general components of Alternative 3, option 3C, are:

A. Installing and maintaining dual activated carbon units at homes affected by contamination from the CryoChem site and continuing maintenance of dual carbon units currently

installed at 13 homes affected by contamination from the site.

B. Conducting periodic sampling to ensure that filters are operating properly.

C. Conducting periodic sampling to ensure that homes potentially affected by the site do not become impacted.

D. Installing and maintaining carbon units at homes which become affected by the site.

E. Conducting sampling at homes outside of the plume of contamination to ensure that these homes do not become affected by the site.

Options 3A and 3B both involve pumping ground water from a central well within the contaminated aquifer, treating the ground water by removing volatile organic compounds, and distributing the treated water to residents affected or potentially affected by contamination from the CryoChem site.

An existing well would be prepared or a new well would be drilled within the plume of contamination and a water pump installed. The pump would deliver water to: 1) a series of carbon units, 2) an air stripper, or 3) a combination of both, and then to a storage tank at the required system pressure. The operation of the pump would be controlled by the level of water within the storage tank. After the water is treated, it could be distributed to residents at a rate and system pressure which could meet or exceed peak demand.

The operation and maintenance of the pump, carbon adsorption units and/or air stripper, storage tank and distribution system would have to be placed under the responsibility of an as yet to be determined authority.

The actual design and maintenance schedule of the carbon units would depend upon ground water samples collected from the plume of contamination and other testing. An ultraviolet disinfection system would also be installed. The equipment would be housed in a heated structure to protect it from freezing.

A packed tower air stripper with countercurrent flow would be used in Option 3A to treat the contaminated ground water. The air stripper may result in 99% removal of volatile organic chemicals from the water. The volatile organic chemicals would, however, be discharged to the air. Option 3A assumes that carbon adsorption units will not be necessary to further treat the effluent from the air stripper. If necessary, a carbon adsorption unit can be installed to further treat the effluent from the air stripper.

A pilot test would be performed to ensure that appropriate effluent levels, as they are established within applicable federal and state guidelines, can be attained and that air emissions will not exceed applicable standards.

The distribution system would consist of a minimum 4-inch diameter water main connecting the storage tank and carbon units and/or air stripper to the homes. Each of the homes currently affected or potentially affected by the CryoChem site would be connected into the distribution system. The system would be designed to accept additional connections should additional homes become contaminated. The system capacity would not be designed to serve new development in the area. A storage tank would be necessary to provide water during times of pump failure or maintenance. This Option does not provide for additional fire protection, i.e., more protection than residents currently have.

The existing carbon units at the homes would be removed. the affected and potentially affected residential wells should be abandoned to retard further migration of contamination through the well bore. Institutional controls would be necessary to ensure that no additional private wells are drilled within the contamination plume which may exacerbate the spread of contamination.

Periodic sampling would be required to ensure that the carbon units and/or air stripper are working effectively and that the schedule for carbon replacement or air stripping tower maintenance is sufficient. Sampling of the effluent would be required until remediation of the ground water aquifer is completed.

In Option 3C, dual activated carbon units would be installed and maintained at each of the homes affected by the CryoChem site. An ultraviolet disinfection system would also be installed and maintained at these homes.

Thirteen homes currently are equipped with carbon units. Based on performance history, the first carbon unit would be replaced every 6 months and a verification sample collected twice a year. This schedule would be adjusted, if necessary, based upon further review of performance and additional sampling results. Maintenance of the carbon units at each house would be required until ground water remediation is completed or a permanent remedy is selected which would provide clean water for the homes.

Each of the options considered under Alternative 3 must supply water which meets all criteria established in the Safe Drinking Water Act or Pennsylvania's Safe Drinking Water Regulations. In addition, any alternative involving the use of an air stripper must ensure that the air effluent meets criteria established under the Clean Air Act and Pennsylvania's Air Resource Regulations. Any alternative requiring the disposal of spent carbon requires that applicable regulations in the Resource

Conservation and Recovery Act (RCRA) are followed.

The costs for Alternative 3 are presented in Tables 7, 8, and 9. The costs depicted in Tables 7 (Option 3A) and 8 (Option 3B) assume that 33 homes and businesses will be connected to a new water supply. This ROD addresses a total of 33 homes and businesses which are affected or potentially affected by contamination from the CryoChem site.

The costs depicted in Table 9 (Option 3C) assume that 33 additional homes and businesses will be equipped with carbon filters. The costs depicted in Table 9A include costs for carbon units on 20 homes affected by contamination from the CryoChem site. Potentially affected homes are not included in cost figures depicted in Table 9A.

ALTERNATIVE 4 - Development of a New Uncontaminated Water Supply

This alternative involves construction of a new water supply well, or preparation of an existing water supply well, and construction of a distribution system to provide clean water to the affected and potentially affected homes and businesses. The location of the new well would be determined during the remedial design phase of the project. Based upon current information, a possible location for the new well is approximately 200 feet west of Fancy Vale Avenue along Route 562. As additional data are collected during the investigation and study being completed for Operable Unit 2, the well location and construction details may be verified or modified.

A pump, which would deliver water to a storage tank on an as needed basis, would be installed in the new well. The storage tank would be constructed to provide backup capacity in the event of pump failure or during pump maintenance. The storage tank would also enable a pump with a lower capacity to be installed which would operate in response to specified tank water levels. This alternative does not provide for additional fire protection, i.e., more protection than residents currently have.

Water from the storage tank would be delivered to affected and potentially affected residents and businesses through a minimum 4-inch diameter water main. The water system would be capable of serving affected and potentially affected residents at a rate and pressure suitable to meet or exceed peak demands. The capacity of the new water system would not be designed to serve new development in the area.

The operation and maintenance of the newly installed water system would be placed under the direction of an as yet to be determined authority. Periodic monitoring of the water, in accordance with applicable state and/or federal requirements, is necessary to ensure its quality.

TABLE 7

ESTIMATED COST TO TREAT WATER FROM NEW WELL IN PLUME BY AIR STRIPPING

	Capital Cost	Annual O&M
Well Installation	$ 2,000	
Well Pump and Controls	5,000	5,000
Structure and Storage Tanks	78,000	6,000
Distribution Pumps	23,000	6,000
Electrical Service	10,000	
Air Stripper	20,000	2,000
Force Main	91,000	1,000
House Service & Meters	67,000	2,000
Miscellaneous	10,000	
Lab Analysis		4,000
In-House Carbon Removal System	6,000	____
	$ 310,000	$26,000
Bid Contingency (15%)	46,000	
Scope Contingency (10%)	31,000	
Construction Subtotal	$ 390,000	
Permitting and Legal (5%)	19,000	
Engineering Design (10%)	39,000	
Services During Construction (8%)	31,000	
Total Capital Cost	$ 480,000	
Present worth at 10% discount rate and 30 years.		
	$ 720,000	

TABLE 8

ESTIMATED COST TO TREAT WATER FROM NEW WELL IN PLUME WITH ACTIVATED CARBON

	Capital Cost	Annual O&M
Well Installation	$ 2,000	
Well Pump and Controls	5,000	5,000
Structure and Storage Tanks	88,000	6,000
Distribution Pumps	23,000	7,000
Electrical Service	10,000	
Activated Carbon System	36,000	27,000
Force Main	91,000	1,000
House Service & Meters	67,000	2,000
Miscellaneous	10,000	
Lab Analysis		5,000
In-House Carbon System Removal	6,000	
	$ 340,000	$53,000
Bid Contingency (15%)	50,000	
Scope Contingency (10%)	34,000	
Construction Subtotal	$ 420,000	
Permitting and Legal (5%)	21,000	
Engineering Design (10%)	42,000	
Services During Construction (8%)	34,000	
Total Capital Cost	$ 520,000	

Present worth at 10% discount rate and 30 years.

$ 1,000,000

TABLE 9

ESTIMATED COST TO TREAT WATER FROM RESIDENTIAL WELLS WITH ACTIVATED CARBON

33 AFFECTED AND POTENTIALLY AFFECTED HOMES

	Capital Cost	Annual O&M
Purchase of Carbon Systems		
13 Presently in Homes	$ 9,100	
20 New Systems	28,000	
Sampling and Analysis		$ 42,000
Carbon and UV Replacement	____	18,000
	$ 37,000	$ 60,000
Bid Contingency (15%)	5,000	
Scope Contingency (10%)	4,000	
Construction Subtotal	46,000	
Permitting and Legal (5%)	2,000	
Engineering Design (10%)	5,000	
Services During Construction (8%)	4,000	
Total Capital Cost	$ 57,000	
Present worth at 10% discount rate and 30 years.		
	$ 620,000	

TABLE 9A

ESTIMATED COST TO TREAT WATER FROM RESIDENTIAL WELLS WITH ACTIVATED CARBON

20 AFFECTED HOMES

	Capital Cost	Annual O&M
Purchase of Carbon Systems		
13 Presently in Homes	$ 9,100	
7 New Systems	8,400	
Sampling and Analysis		$ 25,000
Carbon and UV Replacement	———	10,000
	$ 18,000	$ 35,000
Bid Contingency (15%)	3,000	
Scope Contingency (10%)	2,000	
Construction Subtotal	23,000	
Permitting and Legal (5%)	1,100	
Engineering Design (10%)	2,300	
Services During Construction (8%)	1,800	
Total Capital Cost	$ 28,000	

Present worth at 10% discount rate and 30 years.

$ 360,000

More than one attempt at drilling a new well is possible. Since the rate of withdrawal from the new well would be small, there would be little effect on the migration behavior of the contaminant plume. If an uncontaminated well outside the plume cannot be suitably located, treatment technologies similar to those described in Alternative 3 may be employed to provide clean water to affected and potentially affected residents.

The water distributed to residents in this alternative would need to meet all criteria within the Safe Drinking Water Act and Pennsylvania's Safe Drinking Water Regulations.

The costs associated with this alternative are shown in Table 10. This alternative assumes that 20 homes currently affected by the CryoChem site would be connected to the new water system. This alternative also assumes that 11 additional homes and 2 businesses would also be connected into the new water system.

IX. Summary of the Comparative Analysis of Alternatives

Each of the 4 remedial alternatives for this operable unit are compared and evaluated against 9 criteria to determine which remedial alternative and combination of technologies and management or process options will best meet the primary objective of this ROD. The 9 evaluation criteria are:

1. **Overall Protection of Human Health and the Environment:**

   Whether or not the remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced or controlled through treatment, engineering controls, or institutional controls.

2. **Compliance with ARARs:**

   Whether or not the remedy will meet all applicable or relevant and appropriate requirements (ARARs) of federal and state environmental statutes and/or provides grounds for invoking a waiver. Whether or not the remedy complies with advisories, criteria and guidance that EPA and PADER have agreed to follow.

3. **Long-term Effectiveness and Permanence:**

   The ability of the remedy to maintain reliable protection of human health and the environment over time once the cleanup goals have been met.

TABLE 10

ESTIMATED COST TO INSTALL NEW WELL OUTSIDE PLUME

	Capital	Annual O&M
Well Installation	$ 4,000	
Well Pump and Controls	5,000	$ 5,000
Structure and Storage Tanks	85,000	6,000
Distribution Pumps	23,000	5,000
Electrical Service	10,000	
Force Main	86,000	1,000
House Service and Meters	67,000	2,000
Miscellaneous	10,000	
Lab Analysis		1,000
In-House Carbon System Removal	6,000	
	$300,000	$20,000
Bid Contingency (15%)	44,000	
Scope Contingency (10%)	30,000	
Construction Subtotal	$370,000	
Permitting and Legal (5%)	18,000	
Engineering Design (10%)	37,000	
Service During Construction (8%)	30,000	
Total Capital Cost	$450,000	
Present worth at 10% discount rate and 30 years		
	$640,000	

4. **Reduction of Toxicity, Mobility and Volume:**

   The anticipated performance of the treatment technologies the remedy may employ.

5. **Short-term Effectiveness:**

   The period of time needed to achieve protection, and any adverse impacts on human health and the environment that may be posed during the construction and implementation, until cleanup goals have been achieved.

6. **Ability to be Implemented:**

   The technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

7. **Cost:**

   Includes estimated capital, operation and maintenance, and net present worth costs.

8. **State Acceptance:**

   Indicates whether, based on its review of the focused feasibility study, the proposed plan, and the Record of Decision, the State concurs with, opposes, or has no comment on the preferred and selected alternatives.

9. **Community Acceptance:**

   Indicates whether, based on its review of the focused feasibility study and the proposed plan, the community agrees with, opposes, or has no comment on the preferred alternative.

The following section compares each of the 4 remedial alternatives developed in this ROD against each of the 9 evaluation criteria.

A. **Overall Protection of Human Health and the Environment**

Alternatives 2, 3 and 4 are each protective of human health. The water which would ultimately be distributed to the affected and potentially affected homes would meet or exceed all federal and state drinking water standards. Drinking water standards are established within the Safe Drinking Water Act. Furthermore, Alternative 2 would provide protection of human health without monitoring because the Boyertown municipal water system does not

contain any of the volatile organic chemicals originating from the CryoChem site. The Borough is also required to sample their water to ensure that standards contained within the Safe Drinking Water Act and Pennsylvania's Safe Drinking Water Regulations are met. Thus, Alternative 2 would be the most protective of human health.

When properly designed and sufficiently tested, a new water supply developed outside of the plume of contamination would not contain volatile organic chemicals originating from the CryoChem site. However, periodic water sampling would be employed as part of Alternative 4 to ensure the protection of public health.

When properly designed and sufficiently tested, a new water supply developed within the plume of contamination would discharge water into the distribution system which would meet or exceed all federal and state drinking water standards. The discharge from carbon units at individual homes would also meet applicable standards. However, periodic water sampling would be employed as part of Alternative 3 to ensure the protection of public health.

Alternative 1 would not be protective of human health. The carbon units installed at homes would be removed under the no action alternative.

Alternative 3 would be most protective of the environment because the treatment employed in this alternative would reduce the amount of volatile organic chemicals already in the environment. Management or process options 3A and 3B would remove contaminants near the source area. Option 3C would also remove contaminants from the within the plume.

Unless existing private wells are plugged and abandoned as part of Alternatives 1, 2, 3A, 3B and 4, these alternatives would not satisfactorily inhibit the further downgradient migration of contaminants. Should the plume spread further, additional homes and wells downgradient from the site could be affected. Since private wells at the edge of the contaminant plume would be pumped intermittently during implementation of Alternative 3, option 3C, this alternative would have the added benefit of providing some protection for downgradient users of ground water.

Alternative 3 is the alternative which best combines protection of human health and the environment and consistency with the remediation of the entire site. Thirteen homes affected by the CryoChem site currently have carbon units installed. Sampling data indicates that human health has been protected by these units.

B. Compliance with ARARs

Table 11 identifies Applicable and Relevant or Appropriate Requirements for the alternatives developed in this ROD.

TABLE 11

ARARs
page 1 of 2

Law, Regulation, or Standard	Source of Regulation	Description	Alternatives Affected
FEDERAL			
Safe Drinking Water Act	Safe Drinking Water Act, 40 CFR 141 through 143	This Act establishes maximum contaminant levels (MCL) and MCL goals (MCLG) at levels that would result in no known or potential adverse health affects. MCLs are enforceable health goals. In addition, this Act establishes guidelines for secondary drinking water standards	This Act affects all alternatives
Standards of Performance for New Stationary Source	Clean Air Act, 40 CFR 60	These regulations establish the general provisions and performance standards for stationary sources of air emissions	These regulations affect the alternative requiring air stripping
National Ambient Air Quality Standards (NAAQS)	Clean Air Act, 40 CFR 50	These standards define levels of air quality which are necessary to protect public health. Standards have been established for sulfur oxides, particulate matter, carbon monoxide, ozone, nitrogen dioxide, and lead	These standards affect the alternative requiring air stripping
Hazardous Waste Management System: General	40 CFR 260, et seq	RCRA regulates the generation, transport, storage, treatment, and disposal of hazardous wastes. CERCLA Section 104 (c)(3)(B) specifically requires that hazardous substances generated from remedial actions be disposed of at facilities in compliance with Subtitle C of RCRA	RCRA Subtitle C affects alternatives that generate waste carbon or require the installation of a new well in the plume
Resource Conservation and Recovery Act (RCRA) standards applicable to generators of hazardous waste	RCRA Subtitle C Section 3002 40 CFR 262	Section 262 establishes standards for generators of hazardous wastes. This section requires that generators comply with the requirements for identification, accumulation, recordkeeping, and reporting	40 CFR 262 affects alternatives that generate waste carbon or require the installation of a new well in the plume
RCRA standards applicable to transporters of hazardous waste	RCRA Subtitle C Section 3003 40 CFR 263 and 49 CFR 171 through 179	The regulations set forth in 40 CFR 263 (and applicable parts of 40 CFR 262) establishes the responsibilities of generators and transporters of hazardous waste in the handling, transportation, and management of such wastes. These regulations concern manifesting, labeling, using proper containers, recordkeeping, and reporting discharges	40 CFR 263 affects alternatives that involve the transport of waste carbon off site or require the installation of a new well in the plume
Occupational Safety and Health Act (OSHA)	29 CFR 1910	This Act establishes guidelines, requirements, and regulations to provide for the health and safety of workers conducting remedial action activities	This Act affects all alternatives except the in-house carbon filter systems because these alternatives involve construction activities

ARARs
(Continued)

Law, Regulation, or Standard	Source of Regulation	Description	Alternatives Affected
STATE:			
Pennsylvania Safe Drinking Water Regulations	Title 25, Part I, Subpart C, Article II, Chapter 109	Protects public health and safety by assuring that public water systems provide a safe and adequate supply of drinking water by establishing drinking water standards, quality standards, permit requirements, design and construction standards, system management responsibilities and requirements for public notice	These regulations affect all alternatives.
Pennsylvania Air Resource Regulations	Subchapter C, Section 127	Establishes special requirements for sources located in or significantly impacting nonattainment areas. With regard to VOCs, this regulation applies to any new source with maximum allowable emissions greater than 50 tons per year, 1,000 tons per day, or 100 pounds per hour, whichever is more restrictive	These regulations affect the alternative requiring air stripping
LOCAL:			
Review procedure for Borough of Hoyertown Water Distribution System Extensions	Borough of Hoyertown	Procedure to facilitate reviews of proposed developments that require extensions of and connections to the Borough of Hoyertown water distribution system	This procedure applies to the alternative that involves connection to the Hoyertown municipal system.

Note:

In addition to these ARARs, one TBC was identified. This is an OERR directive titled "Control of Air Emissions from Air Strippers at Superfund Ground-Water Sites" which it is anticipated will be available before the end of 1989.

Alternatives 2, 3 and 4 should each comply with Applicable, Relevant and Appropriate Requirements (ARARs) and guidance criteria. The water supplied under Alternative 2 would consistently meet federal and state standards. Periodic sampling would be required of the Borough of Boyertown to ensure that standards contained within the Safe Drinking Water Act and Pennsylvania's Safe Drinking Water Regulations are met. Since the Borough water supply does not contain volatile organic chemicals from the CryoChem, the standards would be met.

The Borough of Boyertown has review procedures applicable to extensions to their water system. The Borough currently has several objections to the implementation of Alternative 2. If the Borough does not approve of the water line extension, Alternative 2 may not comply with this ARAR.

Alternative 4 would meet federal and state standards, but would need to be periodically checked to ensure that the water supply does not become degraded should volatile organic chemicals from the site migrate into the well. Periodic sampling would be required to ensure that the water distributed to residents would meet standards contained within the Safe Drinking Water Act and Pennsylvania's Safe Drinking Water Regulations.

Water supplied under Alternative 3 would meet federal and state standards, but because the water supply is contaminated by volatile organic chemicals from the CryoChem site, periodic monitoring of the effluent would be required. The water distributed to residents would need to meet all standards contained within the Safe Drinking Water Act and Pennsylvania's safe Drinking Water Regulations. In addition, the air stream effluent from the air stripper would need to meet criteria established within the Clean Air Act and Pennsylvania's Air Resource Regulations. Alternatives involving the use of carbon adsorption also would need to comply with guidelines contained within the Resource Conservation and Recovery Act.

Alternative 1 would not meet federal and state standards since the public would be supplied with water which does not currently meet federal and state standards.

C. **Long-term Effectiveness and Permanence**

Alternative 2 is the most permanent remedy for Operable Unit 1. Once the system is installed, the water supplied would not contain volatile organic chemicals from the CryoChem site.

Alternative 4 is a permanent remedy if hydraulic and chemical testing completed during the RI/FS for Operable Unit 2 and during the design of this alternative indicate that the well would not be degraded by volatile organic chemicals from the CryoChem site based on the hydraulic gradient and the new well's capture zone. Once the remedy is implemented, periodic sampling would be

required to ensure the long-term effectiveness of the remedy.

Alternative 3 is not a permanent remedy since the source of ground water supplied is contaminated. After the RI/FS is completed, a remedy for the site will be selected. If the results of the RI/FS indicate that ground water extraction at the site will be necessary, an alternative similar to Alternative 3 may be developed as a permanent remedy for Operable Unit 2. Alternative 3 can be considered an interim remedy for Operable Unit 1.

Alternatives 2, 3 and 4 each require long-term maintenance, but this maintenance would be most critical to Alternative 3 since a breakdown would result in the distribution of contaminated water to residents.

Alternatives 3 or 4 are the most consistent with the long-term remediation of the CryoChem site. The treatment options which are part of Alternative 3 would help to reduce the amount of volatile organic chemicals in the environment. Sampling and monitoring required in Alternatives 3 and 4 could be integrated into the remedy employed for the entire site.

D. **Reduction of Toxicity, Mobility, or Volume through Treatment**

Only Alternative 3 would result in a reduction in the volume of volatile organic chemicals in the aquifer. Management or process option 3A simply would transfer the volatile organic chemicals from the aqueous phase to the vapor phase and would discharge them into the air. Management or process options 3B or 3C would remove contaminants from the immediate environment, although disposal of the residual (spent carbon) in a safe and effective manner would be required.

Alternatives 1, 2 and 4 would not act to reduce the volume, toxicity, or mobility of contaminants in the aquifer.

Only Alternative 3 would reduce the mobility of the contaminant plume. Options 3A and 3B would inhibit the further migration of contaminants off the CryoChem site, but would be ineffective at inhibiting the further spread of contaminants at the edge of the plume. Option 3C would be the most effective means of inhibiting the further downgradient migration of the contaminants since private wells near the edge of the plume would remove contaminants from the aquifer.

Unless private residential wells are plugged and abandoned under Alternatives 1, 2, 3A, 3B and 4, these alternatives would do little to reduce the mobility of contaminants which have already migrated beyond the site boundary.

Alternative 3, option 3C, has already been proven to reduce the volume of contaminants at 13 homes affected by the CryoChem site.

E. Short-term Effectiveness

EPA has divided the site into two operable units to enable prompt provision of a clean water supply to residents as part of the first operable unit. The remediation of the entire site would be addressed under Operable Unit 2.

Alternative 3, option 3C, would be the quickest remedy to implement and is the one which would least impact the environment during construction and implementation. Alternative 3 would be the quickest means to protect public health, although Alternatives 2 and 4 would also be protective of public health.

Alternative 3, option 3C, would provide immediate protection of human health at the 13 homes with the most serious contamination since these homes are currently equipped with carbon units.

F. Ability to Implement

Table 12 indicates the implementation time for each alternative. Each of the alternatives consists of proven remedial technologies and management or process options. Each technology has been effective at treating volatile organic chemicals at other sites., Each management or process option consists of a reliable strategy to distribute clean water to residents.

TABLE 12
IMPLEMENTATION TIME

Alternative	Time
1	-
2	12-18 months
3A	9-15 months
3B	9-15 months
3C	<6 months
4	6-12 months

Alternative 2 would be the most difficult remedy to implement and would take the longest time to implement. Alternative 3 would require pilot testing and/or periodic sampling to ensure efficient operation, but would be only moderately difficult to implement. Alternative 4 would require initial testing and

analysis to ensure an adequate and safe water supply, but would be only moderately difficult to implement. Each remedy could be constructed from readily available parts and components.

Alternatives 3 and 4 would require periodic monitoring and sampling to ensure that public health was being protected. Alternatives 3A, 3B and 4 would require sample collection from a central location. Alternative 3, option 3C, would require periodic sampling at several locations, i.e., residential homes. All sampling schedules would be determined during the design phase.

Alternative 2 would require significant coordination and cooperation from the Borough of Boyertown and communities along the right-of-way for the water line. Alternative 4 and Alternative 3, options 3A and 3B, would require the cooperation of the Borough of Boyertown, a public utility or a newly developed authority to operate and maintain the new water supply system. These plans would be determined during the design of the alternative. Alternative 3, option 3C, and each of the other alternatives, would require the cooperation of individual homeowners.

Alternative 4 and Alternative 3, options 3A and 3B, would require additional storage capacity to ensure uninterrupted service. During periods of increased demand or periods when a pump is being repaired or maintained, water could be distributed from the storage tank. Alternative 2 might also require storage capacity to ensure adequate fire protection or uninterrupted service during line maintenance. No storage facility would be required in Alternative 3, option 3C, since pump maintenance would be the responsibiity of the homeowner.

The implementation of Alternative 3, option 3C, would be simplified by the current existence of carbon filter units on 13 affected homes. The fact that sampling data from these 13 carbon units show that the levels of volatile organic chemicals have been reduced below MCLs or $1x10^{-6}$ cancer risk levels demonstrates that technology employed under Alternative 3, option 3C, was proven to be effective.

Alternatives 2, 3 and 4 would need to be adaptable to accomodate new connections into the water systems. Alternative 3, option 3C, would be the most adaptable alternative. Other alternatives would require significant modifications to accomodate new connections unless provisions for new connections are designed up front.

G. Cost

The costs for implementation of each alternative are shown in Tables 6, 7, 8, 9, and 10. The costs assume that 33 connections into a new water line would be made. The costs for Alternative 3, option 3C, are also presented in Table 9A with the assumption

that only 20 carbon units (at affected homes) would be installed and/or maintained. Additional carbon units or service connections would be installed or completed as necessary.

H. State Acceptance

The Commonwealth of Pennsylvania has reviewed the Record of Decision and has concurred with the selected remedy.

I. Community Acceptance

During the public comment period, the Borough of Boyertown and community members objected to Alternative 2 indicating that a connection to the Boyertown municipal system might cause poor quality water to be distributed to homes near the CryoChem site. Other concerns with Alternative 2 included lack of flexibility, significant cost, inadequate fire protection, increased development along the water line, and time of implementation. Some community members favored the new water line as the most effective means of distributing safe drinking water to the public, but expressed an unwillingness to bear any costs associated with water service.

Alternative 3 was favorably received by the public since this remedy could be promptly implemented and would help to reduce total site contamination.

X. Selected Remedy

The remedial action alternatives included in the final analysis were No Action, Connection to an Existing Municipal Water Supply, Treatment of the Contaminated Water and, Development of a New Uncontaminated Water Supply. This operable unit addresses provision of clean water to residents near the CryoChem site. After the RI/FS is completed, a remedy for the entire site will be developed. To the extent practicable, the remedy selected for Operable Unit 2 will be consistent with Operable Unit 1. Any remedial alternative not selected for Operable Unit 1 may be considered for Operable Unit 2 if it will achieve the goals for remediation of the media contaminated by the site.

The selected remedial alternative is a combination of Alternative 3 and Alternative 4. Specifically, this ROD selects installation of dual activated carbon adsorption units or continued maintenance of existing carbon units at affected homes until a permanent clean water supply is developed, implementation of periodic sampling at potentially affected homes, and construction of a new uncontaminated water supply to serve affected and potentially affected homes and businesses. This ROD also provides for periodic sampling to ensure that additional homes do not become impacted before a final remedy for the CryoChem site is selected and implemented.

The components of the selected remedial alternative are:

A. Installation and maintenance of dual activated carbon units and ultraviolet disinfection systems at 7 homes affected by the CryoChem site.

B. Continued maintenance of 13 dual carbon units currently installed at 13 homes affected by the CryoChem site.

C. Periodic sampling at 20 homes affected by the CryoChem site to ensure that the carbon filters are working properly.

D. Periodic sampling at 11 additional homes and 2 businesses to ensure that they do not become affected by contamination from the CryoChem site.

E. Installation and maintenance of dual carbon units at homes which become contaminated by contamination from the CryoChem site.

F. Periodic sampling of homes outside the affected area to ensure that no additional homes become affected by contamination from the CryoChem site.

G. Locating and/or drilling a new water supply well.

H. Pump testing and well sampling to determine optimal yield and water quality.

I. Design and construction of a water storage tank and distribution system to deliver clean water to residents.

J. Design and construction of an air stripper or carbon adsorption unit(s) to treat the water if necessary.

Alternative 3, option 3C, is the most adaptable, timely, and most easily implemented alternative which is protective of human health and the environment and satisfies the primary objective of this operable unit. Because Alternative 3, option 3C, is only an interim remedy, this ROD also selects development of a new water supply to provide clean water to affected homes and potentially affected homes and businesses on a permanent basis.

The location and construction details of the new water supply well will be finalized during the design stage of the selected remedial alternative. If necessary, based upon results of chemical sampling, an air stripper(s) and/or carbon adsorption unit(s) will be designed and installed on the new well to ensure that the water delivered to residents is free of volatile organic contamination.

After the RI/FS is completed and a remedy selected for the entire CryoChem site, the remedy for this operable unit may be revisited and revised to fit into the remedial strategy for the entire site. After the RI/FS is completed, additional information which becomes available may direct EPA to reevaluate the remedial alternative selected for Operable Unit 1 and modify it, if necessary, to become as consistent as possible with the overall remediation of the CryoChem site.

The costs for the selected remedial alternative are indicated in Tables 9A and 10.

XI. Statutory Determinations

A. Protection of Human Health and the Environment

The selected alternative is protective of human health. The interim remedy, i.e., installation of dual activated carbon units, would reduce the volume and mobility of volatile organic chemicals in the environment while it is implemented. No unacceptable short-term or long-term risks will be caused by implementation of this remedy. The remedial technologies employed in the selected remedy are proven to reduce the concentrations of volatile organic chemicals to acceptable levels.

B. Attainment of ARARs

Given the limited scope of this operable unit, the selected remedy will attain applicable or relevant and appropriate requirements by preventing current and future ingestion of ground water containing unacceptable levels of volatile organic chemicals.

The selected remedy for Operable Unit 1 will not effectively restore the ground-water aquifer to its designated class. The restoration of the aquifer will be addressed in Operable Unit 2.

C. Cost-effectiveness

The selected remedy is cost-effective. The health of the public will be protected and clean water distributed to residents on an interim and permanent basis for less money than other combinations of alternatives.

D. Utilization of Permanent Solutions Employing Alternative Technologies to the Maximum Extent Practicable

Because of the limited scope of this operable unit, a permanent remediation of the ground-water aquifer was not considered. However, a permanent source of clean drinking water to residents affected by the site will be developed. The remedy selected in Operable Unit 2 will employ permanent solutions to the maximum extent practicable.

E. Preference for Treatment as a Principle Element

The selected interim remedy employs a treatment technology which is proven to reduce the volume of volatile organic chemicals. The preference for treatment of all site related contamination will be considered when selecting a remedial strategy for the entire site.

APPENDIX A

RESPONSIVENESS SUMMARY

CryoChem Superfund Site
Worman, Earl Township, Pennsylvania

A. Overview

EPA's preferred alternative, i.e., Connection to an Existing Municipal Water Supply, for Operable Unit 1, was outlined in the proposed plan and released to the public on July 14, 1989. During the 30-day public comment period and public meeting, the potentially responsible parties, the Borough of Boyertown, and several residents objected to that preferred alternative. In general, the public comments suggested that EPA's preferred alternative would not provide residents with suitable drinking water, was non-adaptable, and too costly. At least 4 residents, however, favored EPA's preferred alternative.

The potentially responsible parties preferred a remedy involving the treatment of contaminated water at individual residences or from a central location. In general, the community preferred a remedy involving treatment of the contaminated water at the site and/or at individual homes, but some residents did feel that the best alternative involved a connection into the municipal water system. The Borough of Boyertown objected to the extension of its water system due to anticipated problems with water quality, water service, and subsequent development.

Based upon the comments received, EPA has reevaluated the remedial alternatives in the proposed plan and has selected an alternative different than that outlined in the proposed plan. The Record of Decision (ROD) details the remedial alternative selected by EPA. Specifically, EPA selects a combination of Alternative 3, Treatment of the Contaminated Water, and Alternative 4, Development of a New Uncontaminated Water Supply, as the remedial strategy for Operable Unit 1 of the CryoChem site.

B. Summary of Comments Received During Public Comment Period

The public comment period was held from July 14, 1989 to August 14, 1989. A public meeting was held on August 9, 1989. A stenographic report of the public meeting was prepared by EPA.

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EPA reviewed, evaluated, and considered comments contained within several sources. The sources include:

A. Stenographic Report of Public Hearing held at the Earl Township Municipal Building, R.D. 3, Boyertown, PA, August 9, 1989.

B. Susan P. LeGros (Montgomery, McCracken, Walker & Rhoads) letter to Christopher Pilla (U.S. EPA), including comments from JACA Corporation, submitted on behalf of potentially responsible parties, August 14, 1989.

C. Raymond C. Schlegel (Roland & Schlegel) letter to Christopher Pilla (U.S. EPA), submitted on behalf of the Borough of Boyertown, August 14, 1989.

D. Borough of Boyertown letter to U.S. EPA, including comments from G. Edwin Pidcock Co., August 7, 1989.

E. Kermit E. Bohn letters to Christopher Pilla (U.S. EPA) July 21, 1989 and August 10, 1989.

F. Betty Burdan letter to Christopher Pilla (U.S. EPA) August 21, 1989.

G. William C. and Frances L. Fleck letter to Christopher Pilla (U.S. EPA), August 3, 1989.

H. Mr. & Mrs. Walter E. Reigner letter to Christopher Pilla (U.S. EPA), undated.

Comments raised during the public comment period on the proposed plan and focused feasibility study are summarized below. Following each comment summary is EPA's response.

COST/FUNDING ISSUES

1. EPA received significant comments concerning who would pay for the remedy which EPA selected. Several individuals expressed a belief that, to the extent possible, CryoChem should be responsible for providing clean water. Others, including affected residents and officials of the Borough of Boyertown, were concerned about who would bear the costs of constructing and maintaining the system, annual water consumption costs, and legal fees for obtaining rights-of-way.

EPA RESPONSE: Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, EPA has the authority to require responsible parties to pay for environmental cleanup or to reimburse EPA for costs the government incurs in responding to environmental contamination. In this case the potentially responsible parties are the past and present owners of the CryoChem site. EPA will give these entities the opportunity to implement and pay for the selected remedy. If the potentially responsible parties choose not to implement the remedy, EPA will implement the remedy and attempt to recover its costs from these parties.

The costs of the remedy include capital costs and fees associated with obtaining rights-of-way. Before a remedy is designed and implemented, a party would have to be designated and charged with the responsibility for operating and maintaining a new water system.

REMEDIAL ALTERNATIVE PREFERENCES

1. The potentially responsible parties suggested that EPA preferred the connection to Boyertown's water supply over other remedial alternatives due to the existence of a reliable authority which would operate and maintain the new water line. The comments further indicated that an authority would have to be established to operate and maintain any of the alternatives which include development of a new water system, thus, the existence of an authority should not be considered an evaluation criterion by EPA.

EPA RESPONSE: EPA must evaluate each remedial alternative based upon long-term effectiveness and administrative implementability. Because the Borough of Boyertown already has a responsible authority to operate and maintain the Borough's water system, a connection to an extension of the municipal system could be considered to be the most reliable long-term remedy in terms of administrative implementation.

Implementation of other remedial alternatives involving development of a new water supply system require the development of a new authority. A new authority responsible for the operation and maintenance of a new water supply will be developed before a remedy including a new water supply is implemented.

2. The potentially responsible parties and other individuals observed that some alternatives, e.g., Alternative 3, Treatment of the Contaminated Water, provided two benefits. First, residents would be provided with clean water (after treatment) and second, the ground water contamination would be addresed.

EPA RESPONSE: EPA agrees with this comment. However, the primary objective of Operable Unit 1 is to supply residents with clean water as early as possible. EPA has reevaluated the remedial alternatives and has selected a combination of alternatives which will be more flexible and thus can be integrated into the remedial strategy for the entire site.

The use of a ground water treatment well as a public supply well may not be suitable unless adequate backup can be designed to provide clean water should the treatment system fail or require maintenance.

DECISION PROCESS

1. The potentially responsible parties and some residents indicated that EPA should wait until the RI/FS for the CryoChem site is completed before selecting an alternate water supply for affected residents. The comments suggest that contaminated ground water beneath the site will be pumped and treated by reliable technologies and that after the contaminated ground water is treated, it could be distributed to affected residents. The potentially responsible parties indicated further that the RI/FS, which would be used by EPA to select a remedy for the entire site, is scheduled to be completed in the fall of 1989.

EPA RESPONSE: EPA has separated the CryoChem site into two operable units because residential wells near the CryoChem site contain elevated levels of carcinogenic chemicals. The remedy for Operable Unit 1, Drinking Water Supply, provides affected residents with alternate water, thereby eliminating the risk to public health. Based on the levels of volatile organic chemicals in residential wells, EPA believes an early response to provide clean drinking water is needed.

EPA is concerned by the possibility that clean water may not be provided to residents hooked up to a treatment system should the treatment system fail or require maintenance. Thus, EPA has not elected to combine treatment of the site with provision of clean water.

The remedy selected in the Record of Decision would be flexible so that it can be integrated into the remedy selected for Operable Unit 2. The remedy selected in Operable Unit 2 will be consistent with the remedy in Operable Unit 1.

2. Several individuals expressed interest in EPA's decision-making process. Questions from the public concerned how the final decision would be made and whether EPA's final decision can be appealed. One resident wanted to know if the public voted on the remedy. Another resident wanted to know how the public would be informed of the selected remedy.

EPA RESPONSE: EPA has evaluated public comments and has reevaluated the remedial alternatives for Operable Unit 1. As a result, EPA has selected an alternative different than that outlined in the proposed plan and believes this alternative will be acceptable to both EPA and the public. The public does not vote on various remedies, but is able to submit comments on the remedial alternatives. EPA decides upon the selection of a remedial alternative. The Record of Decision will be made available to the public in the administrative record. The availability of the ROD will be publicized.

EPA's final decision is embodied within the Record of Decision. The public comment period was the opportunity for concerned residents to comment on EPA's proposed plan. There is no appeal process.

3. One resident asked about the status of the 3 alternatives not chosen by EPA.

EPA RESPONSE: The alternative outlined in the proposed plan and discussed at the public meeting was preferred by EPA. The other 3 alternatives were reevaluated in light of comments received by EPA and reconsidered for implementation. In fact, EPA selected an alternative different than the one outlined in the proposed plan.

TECHNICAL CONCERNS REGARDING REMEDIAL ALTERNATIVES

1. Boyertown Borough officials and several other individuals were concerned about whether Boyertown's water system could provide enough capacity to service the homes affected by the CryoChem site and others that may hook up to the system in the future. Several individuals also questioned the size of the

proposed water main from Boyertown's municipal water system. They questioned the ability of a 4 inch water line to provide adequate fire protection and to accept new hookups.

EPA RESPONSE: The scope of the focused feasibility study included 20 homes affected by the CryoChem site. Therefore, the municipal supply system was sized according to expected water consumption within these homes. Boyertown officials initially indicated that the water system had the capacity to add these homes.

The pipe was not sized to allot for future development in the area for two reasons. First, it would be difficult to estimate the amount and type of future development along the 3 1/2 miles between Boyertown and the site. Second, EPA does not believe that it would be equitable to have the potentially responsible parties or Superfund pay for a system that would be designed to include potential future hookups to the system not related to the CryoChem site. An entity other than EPA or the potentially responsible parties would have to pay for the cost differential between constructing a 4-inch pipeline and constructing a larger pipeline. For the same reasons, the new water supply would not include provisions for more fire protection than the residents currently have.

2. Both homeowners and Boyertown officials were concerned about the quality of water that could be provided to the homes that are affected by the CryoChem site. Mr. Layman, a Borough official, stated that PADER was urging Boyertown to complete its dead ends. He also stated that, based on other experiences with dead ends in the Boyertown water system, he believes that the water in the extension to the residents near CryoChem will stagnate in the line. **The Borough also indicated that it may not be feasible to provide a loop between Boyertown and the affected area.**

EPA RESPONSE: EPA acknowledges that avoiding dead ends is always good practice and will provide better water quality. A loop feature, if feasible, could be considered in the design of the remedy. Considering the number of connections and the length of the line, a loop feature may not be cost effective. Based on these and other concerns, EPA has opted to select a remedy other than connecting the affected homes into an extension of the Borough's water system.

3. One individual pointed out the fact that Boyertown's water has been chlorinated thereby necessitating the use of carbon

filters at homes to be connected into the municipal water system. Another individual inquired whether the carbon filters provide adequate protection to residents.

EPA RESPONSE: Typically, a municipal water supplier adds chlorine, which breaks down to chloroform, to rid the water of disease-carrying organisms. EPA accepts the small risk associated with drinking the small amount of chloroform in typical city tap water because of the large benefit of drinking water which is free from disease. The carbon filters are effective. They will provide residents with clean drinking water, provided the filters are changed according to schedule.

4. Several individuals questioned how EPA's proposed remedy would affect the ground water contamination at the site. Two individuals noted that by not pumping the individual wells at the homes, contamination could spread downgradient quicker.

EPA RESPONSE: The remediation of the entire CryoChem site will be completed under Operable Unit 2, Area Wide Ground Water and Source Area. The primary objective of Operable Unit 1, Drinking Water Supply, is to provide clean water to residents. Once private wells cease being operated, and the ground water contamination is being addressed in Operable Unit 2, the private residential wells should be plugged and abandoned to prevent further migration of contaminants through the well bore.

If ground water water were pumped from a well outside of the plume of contamination, EPA believes it will have little effect on the contaminant plume due to the relatively small amount of water extracted and the probable high transmissivity of the aquifer. The effects of not pumping residential wells near the site are not known, but are probably not significant.

5. A number of individuals at the public meeting had questions concerning the extent of a new water supply system. One homeowner, located near other homes with carbon filters, questioned why his water was not tested. Another individual questioned why local businesses were not included in the focused feasibility study. Other residents had questions concerning the limit of the new water line and why residents with TCE detections in 1982 are not considered.

EPA RESPONSE: EPA and the potentially responsible parties continue to sample the ground water in the vicinity of the site

in an effort to determine the extent of the contamination. The remedy selected in this Record of Decision includes homes and businesses affected or potentially affected by the CryoChem site based upon currently available data. The selected remedy also provides for sampling at homes outside the affected or potentially affected area to ensure other homes do not become affected by the site.

6. The Borough of Boyertown and at least one resident commented on the length of time to implement EPA's preferred alternative. It was suggested that it may take longer than anticipated. EPA was also asked what would be done in the interim period before a remedy was implemented.

EPA RESPONSE: EPA acknowledges that implementing the connection to Boyertown municipal supply will require the greatest amount of construction time and that it will take considerable time to obtain appropriate legal agreements. The appropriate agreements, and review processes will be obtained and followed in implementing the connection into the municipal water supply and all other alternatives. Carbon units will be installed at affected homes in the interim period before a remedy is implemented.

7. The potentially responsible parties and residents questioned the potential for increased environmental impacts created by implementation of an alternative which includes construction of a new well outside the plume of contamination. The potentially responsible parties also expressed concern that a well outside the plume of contamination may interfere with remediation of the site.

EPA RESPONSE: EPA assumes that a new well drilled in an uncontaminated area will not affect long-term remediation of the site since the well's projected capacity will be small. The new well will not discharge enough water to significantly effect the contaminant plume. The well will be located and constructed in a manner to ensure that the new water supply will not affect remediation of the contaminated ground water.

8. Two residents had comments related to the construction of monitoring wells and residential wells. One individual questioned if it wasn't possible to case residential wells deeper to keep out contamination. Another individual wondered why monitoring wells were drilled so close to one another at different depths.

EPA RESPONSE: Several monitoring wells are installed for the purpose of sampling ground water from the contaminated aquifer. Because the depth of the contamination is not known, some monitoring wells are intended to monitor deep ground water, while others are intended to monitor shallow water. If the wells are close together, i.e., well clusters, they allow EPA to determine the amount of contamination in shallow and deep ground water.

One way to prevent shallow contamination from entering a well is to extend steel casing below the contaminated level. At this time, EPA does not know the depth of the contamination, thus, deeper casing on residential wells may not keep contamination out of the well bore.

9. The Borough of Boyertown suggested that a second source of water be provided for residents to be used when the water main was being repaired.

EPA RESPONSE: EPA will include consideration for adequate storage capability in each alternative.

10. One resident commented on the probable need for an additional booster pump to deliver water to her home which is topographically higher than route 562.

EPA RESPONSE: During the design phase of any remedial alternative, EPA will consider proper engineering options necessary to deliver clean water to all affected and potentially affected residents.

11. A Borough official noted that two hills existed between the Borough's reservoirs and the affected residents. EPA was asked if the estimated costs for the preferred alternative included costs for pumps to move water over two hills.

EPA RESPONSE: The design specifics of a remedial alternative will be worked out during the remedial design phase.

ENFORCEMENT ISSUES

1. The current site owner corrected an EPA official and indicated that the site currently had a proposed status on the National Priorities List.

EPA RESPONSE: The CryoChem site will be finalized on the National Priorities List in October, 1989. EPA can initiate response actions while the site has a proposed status on the National Priorities List.

2. Two residents asked how the listing of the site on the National Priorities List would affect CryoChem's finances and operations.

EPA RESPONSE: EPA's primary concern is to remediate environmental contamination caused by activities at the CryoChem site. CryoChem must operate in accordance with all applicable regulations. The potentially responsible parties are potentially liable for costs incurred addressing the contamination at the site.

3. One resident inquired as to whether the CryoChem facility was being monitored to determine if they are still polluting the ground water.

EPA RESPONSE: A Remedial Investigation is currently underway at the site. This investigation includes sampling of ground water at and near the site. The potentially responsible parties are potentially liable for all costs incurred in addressing the clean up of environmental media contaminated by the site. The remedial alternative selected for the site will address all pathways of environmental contamination. The owners of CryoChem are currently involved with the Pennsylvania Department of Environmental Resources (PADER) on various permitting issues.

4. The previous site owner requested to know about the degree of contamination in the area.

EPA RESPONSE: EPA's goal in most cleanup actions is to achieve a risk level that will result in no more than one cancer death per million exposed people in a lifetime. The levels of chemicals in some of the residential wells are approaching 1000 times this risk level.

5. The previous site owner requested to know which chemical presented the most risk and why EPA did not go after the chemical manufacturer.

EPA RESPONSE: Dichloroethene is the chemical driving the risk at the CryoChem site. EPA does not go after the chemical manufacturer because they are supplying raw product. CERCLA enforcement does not provide a means to include raw product, only waste.

APPENDIX B

SUMMARY OF ANALYTICAL DATA

Name	P.O. Box	Sample Date	Concentration (µg/L) DCE	TCE	PCE	DCA	TCA	Sample Point
Gonzales	49	10/13/88[a]	ND	ND	ND	ND	ND	--
		12/07/88[a]	ND	ND	ND	ND	ND	--
I.S.C., Inc.	62	10/13/88[a]	ND	ND	ND	ND	ND	--
R&R Garber, Inc.	63	10/13/88[a]	ND	ND	ND	ND	ND	--
Bowers	64	06/02/82[c]	--	ND	ND	--	ND	--
		07/28/87[c]	ND	ND	ND	ND	0.68	--
		10/13/88[a]	ND	ND	ND	ND	ND	--
Moore	65	07/28/87[c]	ND	ND	ND	ND	ND	--
Miller, K.	67	07/28/87[c]	ND	ND	ND	ND	ND	--
Fleck	68	07/27/87	ND	ND	ND	7	ND	1
		07/28/87[c]	7.4	ND	ND	7.4	ND	--
		09/15/87	5	ND	ND	11	8	1
Reigner, Walter	69	05/05/82[c]	--	ND	ND	--	16.0	--
		09/20/83[c]	--	ND	--	--	17.8	--
		12/01/83[c]	--	ND	ND	--	19.0	--
		10/30/84[c]	--	--	--	--	10.2	--
		05/11/87[c]	--	ND	0.13	--	--	--
		07/27/87	ND	ND	ND	ND	ND	1
Romich, Elwood	71	07/27/87	1	ND	ND	ND	7	1
		07/28/87[c]	1	ND	ND	ND	ND	--
		09/15/87	7	ND	1	ND	10	1
Weidner, Paul	72	09/15/87	44	32	15	20	229	1
		03/23/88	252	18	8	54	642	3
		04/27/88	314	13	12	30	146	3
		06/09/88	39	3	2	5	114	3
		07/27/88	288	14	9	14	666	3
		12/01/88	121	6	3	16	186	3
		01/17/89	103	14	8	20	276	3
		03/09/89	99	16	7	26	369	3
Greenly, Lester	73	09/20/83[c]		--	ND	--	--	--
		12/01/83[c]	60.0	14.0	ND	15.0	560	--
		05/11/87[c]	92.45	10.76	5.19	15.11	366	--
		07/27/87	130	12	ND	130	19	1
		07/28/87[c]	130	12	ND	19.0	510	--
		09/15/87	471	37	12	70	1052	1
		10/06/87	1734	14	12	25	571	3
		12/08/87	245	7	6	13	384	3

Name	PO Box	Sample Date	Concentration (µg/L)					Sample Point
			DCE	PCE	TCE	TCA	TCA	
Greenly, Lester (Cont'd)	73	03/17/88	143	5	4	10	268	1
		04/28/88	348	7	7	8	117	1
		06/09/88	135	12	7	12	189	1
		07/28/88	323	7	2	2	565	1
		12/01/88	101	10	6	21	335	1
		01/17/89	123	16	6	43	362	1
		03/09/89	132	14	6	35	460	1
Straube, Gordon	74	05/05/82[c]	--	600	--	--	--	
		09/20/84[c]	--	200	90	--	817	
		12/01/84[c]	10	--	--	12	350	
		10/30/86[c]	--	--	--	--	1120	6
		05/11/87[c]	3033	--	64	ND	198	
		07/28/87	27	1	ND	8	260	1
		09/15/87	192	10	5	17	100	1
		10/06/87	89	ND	ND	13	251	1
		12/09/87	97	ND	ND	11	235	1
		03/17/88	30	ND	ND	1	98	1
		04/28/88	74	ND	ND	7	82	1
		06/09/88	62	1	1	7	189	1
		07/28/88	203	8	3	10	712	1
		12/01/88	12	< 2	< 2	3	140	1
		01/16/89	14	ND	ND	8	112	1
		03/09/89	ND	ND	ND	ND	ND	1
CryoChem, Inc	74A	10/13/88[d]	8	ND	ND	12	140	
C.S. Garber, Inc	75	10/13/88[d]	ND	ND	ND	ND	ND	
Garber	76	08/25/81[c]	--	--	--	--	180	
		04/29/82[c]	--	--	--	--	130	
		05/05/82[c]	--	ND	ND	--	ND	
		09/20/84[c]	--		--	--	90	
		05/11/87[c]	487		--	--	227	
		07/28/87[c]	44	ND	ND	47	71	
		10/13/88[d]	ND	ND	ND	ND	ND	
Miller, Robert	79	07/27/87	ND	ND	ND	ND	ND	1
Dluzen, Alan	80A	07/27/87	ND	ND	ND	ND	ND	1
Garber, C.W.	82	09/20/84[c]	--	--	--	--	110	
		12/01/84[c]	ND	ND	ND	ND	--	
		05/11/87[c]	ND	ND	ND	ND	ND	
Garber, Sr., C.	82	09/15/87	30	1	1	2	41	1
Garber, C.W.	NI	09/15/87	6	ND	ND	3	25	1

Name	PO Box	Sample Date	Concentration (µg/L) DCE	TCE	PCE	DCA	TCA	Sample Point
Discenzo, Jane	88	04/13/82[a]	--	--	16	--	140	
		09/20/84[a]	--	70	--	--	433	
		12/01/84[a]	860	80	--	ND	390	
		10/30/86[a]	--	--	--	--	495	
		05/11/87[a]	4543	563	211	871	286	
		07/28/87	64	6	1	10	290	1
		09/15/87	14	8	4	46	308	3
		10/06/87	171	9	3	24	384	3
		12/08/87	174	9	5	15	336	3
		03/17/88	110	7	2	9	221	3
		04/27/88	153	4	3	13	90	3
		06/09/88	74	4	2	6	166	3
		07/27/89	26	3	1	5	160	3
		12/01/88	58	6	3	10	192	3
		03/09/98	64	8	3	13	28	3
Bauer, Leonard	89	07/27/87	5	3	ND	33	162	1
		09/15/87	113	7	3	30	247	1
		12/08/87	87	3	3	9	248	3
		03/17/88	62	4	2	7	122	3
		04/27/88	57	2	1	6	92	3
		06/09/88	64	5	2	7	162	3
		07/27/88	49	2	1	3	ND	3
		12/01/88	43	4	3	7	162	3
		01/17/89	35	4	2	7	109	3
		03/09/89	39	5	2	8	143	3
Hallman, Ken	100	07/28/87	2	ND	ND	ND	16	1
		09/15/87	16	ND	ND	ND	8	1
Munninger, Robert	101	07/28/87	32	3	ND	5	140	1
		09/15/87	74	4	ND	9	192	1
		10/06/87	85	4	2	6	179	3
		12/08/87	86	3	2	3	208	3
		03/17/88	79	4	2	9	147	3
		04/27/88	128	4	1	8	59	3
		06/09/88	69	3	1	6	125	3
		07/27/88	54	1	1	5	104	3
		12/01/88	30	3	2	4	149	3
		01/16/89	32	4	2	7	102	3
		03/09/89	34	5	2	8	161	3
Ankron, Green	102	08/25/81[a]	--	--	ND	--	95	
		04/13/82[a]	--	--	--	--	90	
		1981 1982[a]	--	53	--	--	203	
		09/20/84[a]	--	--	--	--	254	
		05/11/87	--	--	--	--	ND	
		07/28/87	46	3	ND	6	160	4

Name	PO Box	Sample Date	Concentration (µg/l) DCE	TCE	PCE	DCA	TCA	Sample Point
Ankron, Green (Cont'd)	102	09/15/87	ND	6	4	5	93	3
		10/06/87	129	6	2	10	264	3
		12/08/87	25	1	ND	4	117	3
		03/23/88	56	7	3	25	351	3
		04/27/88	111	5	4	6	51	3
		06/09/88	65	4	2	12	208	3
		07/27/88	113	3	1	4	51	3
		12/01/88	38	4	2	7	151	3
		01/16/89	44	ND	ND	8	142	3
		03/09/89	42	6	2	10	197	3
Miller, Christine	103	08/25/81	..	..	..	..	76	
		07/27/87	41	4	ND	7	170	1
		09/15/87	77	4	3	11	220	1
		10/06/87	79	5	3	7	179	3
		12/08/87	105	7	2	7	221	3
		03/18/88	58	4	2	9	166	3
		04/27/88	139	4	1	11	61	3
		06/09/88	56	3	1	4	29	3
		12/01/88	28	3	2	5	112	3
		01/16/89	31	4	2	7	100	3
		03/09/89	38	5	2	9	157	3
Diener, Augustus	104	1981-1982	..	..	..	..	107	
		07/27/87	17	ND	ND	3	93	1
		09/15/87	77	5	3	7	172	1
		12/08/87	102	5	2	7	195	3
		03/18/88	61	2	1	7	169	3
		04/27/88	65	2	2	11	95	3
		06/10/88	63	1	1	2	50	3
		07/27/88	49	ND	ND	6	122	3
		12/01/88	29	2	1	4	100	3
		01/16/89	34	4	2	7	96	3
		03/09/89	28	5	2	8	129	3
Davidson, Eva	105	07/27/87	33	3	ND	6	130	1
		09/15/87	78	4	3	10	192	1
		10/06/87	63	5	2	ND	240	3
		12/08/87	96	7	3	5	185	3
		03/18/88	64	3	1	6	130	3
		04/27/88	85	2	2	12	49	3
		06/10/88	44	3	1	1	126	3
		07/27/88	ND	ND	ND	ND	ND	3
		12/01/88	26	2	2	4	102	3
		01/16/89	32	ND	ND	7	105	3
		03/09/89	32	ND	2	8	158	3

Name	PO Box	Sample Date	Concentration (µg/L) DCE	TCE	PCE	DCA	TCA	Sample Point
Geisinger, Arnold	106	09/15/87	75	4	2	11	200	1
		12/08/87	116	7	8	6	209	1
		03/18/88	72	1	1	ND	77	1
		04/27/88	94	2	3	8	151	1
		06/10/88	71	1	2	4	188	1
		07/27/88	209	2	1	ND	60	1
		12/02/88	38	4	2	6	143	1
		01/16/89	31	4	2	6	93	1
		03/09/89	43	6	2	9	175	1
Benyo, Albert	107	08/25/81[c]	--	--	--	--	90	--
		07/27/87	58	5	ND	10	220	1
		09/15/87	90	5	3	14	282	1
		10/06/87	116	6	3	18	300	1
		12/09/87	87	18	2	6	203	1
		03/18/88	84	4	3	10	177	1
		04/28/88	134	3	3	3	66	1
		06/10/88	60	4	2	6	114	1
		07/27/88	132	5	2	6	367	1
		12/02/88	21	2	2	3	92	1
		01/16/88	41	5	2	8	125	1
		03/09/89	43	6	3	10	196	1
Goodhart, Larry	108	08/25/81	--	--	--	--	500	--
		07/27/87	9	ND	ND	1	33	1
		09/15/87	5	2	1	64	31	1
Yeager, Bernard	109	1981-1982[c,d]	ND	ND	ND	ND	56	--
		07/27/87	ND	ND	ND	ND	ND	1
		10/13/88[a]	ND	ND	ND	ND	ND	--
Nyman, Mrs.	110/ 110A	04/13/82[c]	--	ND	--	--	--	--
		05/05/82[c]	--	--	ND	--	ND	--
		07/27/87	ND	ND	ND	ND	ND	1
Garber, Jr., Russell	112	04/29/82[c]	--	ND	ND	--	ND	--
		07/27/87	ND	ND	ND	ND	ND	1
Bergman, Richard	114	07/27/87	ND	ND	ND	ND	4	1
		09/15/87	3	ND	1	ND	7	1
Garber, Randell	115	04/29/82[c]	--	--	ND	--	--	--
		06/02/82[c]	--	ND	--	--	--	--
		07/28/87	ND	ND	ND	ND	ND	1
Hinaman	115	10/13/88[a]	ND	ND	ND	ND	ND	

Name	PCO Box	Sample Date	Concentration (µg/L) DCE	TCE	PCE	DCA	TCA	Sample Point
Gilbert, Larry	116	05/05/82	ND	ND	--	ND		
		06/02/82	--	--	--	--	86	
		01/29/82	--	--	--	--	120	
		01/27/87	5	ND	ND	1	19	1
		05/15/87	31	2	1	4	22	3
		06/09/88	ND	ND	ND	ND	25	3
		07/27/88	8	ND	ND	ND	ND	3
		01/17/89	16	2	1	4	49	3
		03/09/89	18	3	1	5	65	3
Keck, Lindsey	124	10/06/87	ND	ND	ND	ND	ND	1
		10/13/88[a]	ND	ND	ND	ND	ND	
Romich, Harry/Seltinger	136	10/06/87	ND	ND	ND	ND	ND	1
		10/13/88[a]	ND	ND	ND	ND	ND	
Hedler, David	137	10/06/87	ND	ND	ND	ND	ND	1
Drabinsky, Frank	139	10/06/87	ND	ND	ND	ND	ND	1
Cinaglia, Ruth	140	10/06/87	ND	ND	ND	ND	ND	1
Iezzi	291	11/01/88[a]	ND	ND	ND	ND	ND	
Romich, Ronald	292	07/27/87	ND	ND	ND	ND	ND	1
Vroman, Frank	296	09/15/87	ND	ND	ND	ND	ND	1
Care, Susan	300	07/27/87	ND	ND	ND	ND	ND	1
McCarraher	301	04/13/82[c]	--	ND	ND	--	ND	
		09/15/87	ND	ND	ND	ND	ND	1
Stein, Vincent	306	07/28/87	ND	ND	ND	ND	ND	1
Gabel, William	307	09/15/87	ND	ND	ND	ND	ND	1
Seidel, Maria	308	07/27/87	ND	ND	ND	ND	ND	1
Fick, Donna	310	09/27/87	ND	ND	ND	ND	ND	1
Drabinsky, John	314	07/27/87	ND	ND	ND	ND	ND	1
		10/13/88	ND	ND	ND	ND	ND	
Shirey, Daniel	316	07/27/87	ND	ND	ND	ND	ND	1
Sherman, Edward	317	07/27/87	ND	ND	ND	ND	33	1
		09/15/87	ND	ND	ND	ND	ND	1

Name	PO Box	Sample Date	Concentration (µg/L) DCE	TCE	PCE	DCA	TCA	Sample Point
Gull, William	317	09/15/87	ND	ND	ND	ND	ND	1
Seidel, Ronald	321	07/27/87	ND	ND	ND	ND	ND	1
Reinhart, Gene	324	07/27/87	ND	ND	ND	ND	ND	1
Royer, Larry	325	07/27/87	ND	ND	ND	ND	ND	1
Brendegam	330	10/13/88[d]	ND	77	ND	ND	ND	--
Hoffman/Hembach	331	12/01/83[c]	--	--	--	ND	--	--
		05/11/87[c]	ND	9 10	ND	--	ND	--
		10/13/88[a,b]	ND	18	ND	ND	40	--
Reinert	335	10/13/88[a]	ND	ND	ND	ND	ND	--
Schomley	336	10/13/88[a]	ND	ND	ND	ND	ND	--
Meyer	343	06/02/82	--	ND	--	--	--	--
		1981-1982		23 2	--	--	--	--
		10/13/88[a]	ND	56	ND	ND	ND	--
Rivello	360	10/13/88[a]	ND	ND	ND	ND	ND	--
Willing	381	10/13/88[a]	ND	ND	ND	ND	ND	--
Willis	439	10/13/88[a]	ND	ND	ND	ND	ND	--
Byler	444	10/13/88[a]	ND	ND	ND	ND	ND	--
Miller, ED	448	07/27/87	ND	ND	ND	ND	ND	1
		10/13/88[a]	ND	ND	ND	ND	ND	--
Yeager	449	07/27/87	ND	ND	ND	ND	ND	1
Dransfield	450	07/27/87	ND	ND	ND	ND	ND	1
		07/28/87[c]	ND	ND	ND	ND	ND	6 5
Beck	454	07/28/87[c]	ND	ND	ND	ND	ND	--
Pusch	455	08/25/81[c]	--	ND	--	--	--	--
		07/28/87[c]	ND	ND	ND	1 7	2 1	--
Block, Paul	451	07/27/87	ND	ND	ND	2	2	1
		09/15/87	ND	ND	ND	ND	ND	1
		10/13/88[d]	ND	ND	ND	5	15	--

Name	PO Box	Sample Date	Concentration (µg/L) DCE	TCE	PCE	DCA	TCA	Sample Point
Michellekler Trout Farm	474	08/25/81[C]	--	--	--	--	ND	
		05/05/82[C]	--	ND	ND	--	--	
		06/02/82[C]	--	ND	ND	--	8.0	
		10/06/87	ND	ND	ND	ND	ND	1
		10/13/88[d]	ND	ND	ND	ND	ND	
Dotterer, George	476	10/06/87	ND	ND	ND	ND	ND	1
CryoChem Monitoring Well #1	NI.	03/23/83[C]	--	ND	ND	--	ND	--
		09/20/83[C]	--	ND	ND	--	--	--
		12/01/83[C]	ND	ND	ND	ND	--	--
		09/23/85[C]	--	--	--	--	ND	--
		07/03/86[C]	--	--	--	--	ND	--
		05/11/87[C]	ND	--	ND	ND	ND	--
CryoChem Monitoring Well #2	NI	03/23/83[C]	--	ND	ND	--	13.6	--
		09/20/83[C]	--	ND	ND	--	--	--
		12/01/83[C]	ND	ND	ND	--	--	--
		07/30/84[C]	--	--	--	--	21.5	--
		10/30/84[C]	--	--	--	--	71.8	--
		05/14/85[C]	--	--	--	--	14.2	--
		09/23/85[C]	--	--	--	--	10.4	--
		07/03/86[C]	--	--	--	--	1.71	--
		05/11/87[C]	6.86	--	ND	10.67	14.8	--
CryoChem Production Well	NI	09/20/83[C]	--	ND	ND	--	220	--
		12/01/83[C]	6.6	ND	ND	12.0	350	--
		07/30/84	--	--	--	--	77.5	--
		10/30/84	--	--	--	--	317	--
		05/14/85	--	--	--	--	226	--
		09/23/85	--	--	--	--	53.7	--
		07/03/86	--	--	--	--	230	--
		05/11/87[C]	22.97	ND	ND	12.72	211	--
Bartholomew	NI	12/01/83[C]	ND	--	ND	ND	--	--
Drabinsky	NI	08/25/81[C]	--	ND	ND	--	ND	--
		07/28/87[C]	ND	--	--	ND	--	--
Mobil (Arco)	NI	12/21/81[C]	--	--	--	--	130	
		09/20/83[C]	--	--	--	--	242	
Grambrone	NI	12/21/81[C]	--	--	ND	--	ND	
Duca (Bush)	NI	12/12/81[C]		ND	ND		13	
		09/20/83[C]		ND	ND		55	

Name	PO Box	Sample Date	Concentration (µg/L) DCE	TCE	PCE	DCA	ECA	Sample Point
Rhodes	NI	1981 1982[c]	..	165	..	..		
Weiss	NI	1981 1982[c]	..	28	..	..		
Isco, Inc	NI	08/25/81	..	ND	ND	..	ND	

Notes

All data is from the Cryo Chem Groundwater Site Analytical Results Summary Residential Well Sampling computer printout dated April 8, 1989 unless otherwise indicated

.. = No data available

NI = PO Box number was not listed with the residential well owner's name

a Samples collected by JACA during Phase I of Remedial Investigation Study (JACA, 1988b)

b In a letter from JACA to Chris Pilla dated November 15, 1988, the name for this entry is listed as Moyer and the PO Box No is #343. However, Moyer at PO Box #343 is listed twice. PRC believes this is an error in the letter

c Data was reported in "Evaluation of Environmental Analyses Performed in the Vicinity of Cryo Chem Corp." prepared by JACA Corp., dated February 24, 1988 (JACA, 1988a)

d Sample was identified as Yeager but no PO Box number was given. PRC assumes this is the same Yeager at PO Box #109. There is another Yeager at PO Box #119

Name	P O Box	Sample Date	Concentration (µg/L) DCE	TCE	PCE	DCA	TCA	Sample Point
Rhodes	NI	1981 1982[c]	-	165	--	--		
Weiss	NI	1981 1982[c]	--	28	--	--		
Isco, Inc	NI	08/25/84	--	ND	ND	--	ND	

Notes:

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NI = P.O. Box number was not listed with the residential well owner's name

a Samples collected by JACA during Phase I of Remedial Investigation Study (JACA, 1988b)

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d Sample was identified as Yeager but no P.O. Box number was given. PRC assumes this is the same Yeager at P.O. Box #109. There is another Yeager at P.O. Box #119

APPENDIX C

INDEX FOR ADMINISTRATIVE RECORD

CRYOCHEM GROUNDWATER CONTAMINATION SITE
ADMINISTRATIVE RECORD FILE *
INDEX OF DOCUMENTS

I. SITE IDENTIFICATION

1) Report: Site Inspection of Cryochem, Incorporated, prepared by NUS Corporation, 5/13/85. P. 100001-100263.

2) Report: A Hazard Ranking System for Cryochem, Incorporated, prepared by NUS Corporation, 6/26/85. P. 100264-100374.

* Administrative Record File available 7/14/89.

Note: Company or organizational affiliation is identified in the index only when it appears in the file.

II. REMEDIAL ENFORCEMENT PLANNING

1) Administrative Order by Consent In The Matter of The Cryochem Site, 2/14/88. P. 200001-200034.

III. REMEDIAL RESPONSE PLANNING

1) Report: Cryochem, Incorporated Final Letter Report, prepared by NUS Corporation, 4/14/87. P. 300001-300093.

2) Report: Evaluation of Environmental Analyses Performed in the Vicinity of Cryochem Corp. [sic], Worman, PA, prepared by JACA Corp., 2/24/88. P. 300094-300142.

3) Report: Scope of Work for CryoChem [sic] RI/FS, prepared by JACA Corp., 4/14/88. P. 300143-300197.

5) Letter to Mr. Christopher Pilla, U.S. EPA, from Dr. Albert C. Gray, JACA Corp., re: Monthly progress report, 6/28/88. P. 300198-300198.

6) Letter to Mr. Christopher Pilla, U.S. EPA, from Dr. Albert C. Gray, JACA Corp., re: Monthly progress report, 7/14/88. P. 300199-300199.

8) Letter to Mr. Christopher Pilla, U.S. EPA, from Dr. Albert C. Gray, JACA Corp., re: Monthly progress report, 8/17/88. P. 300200-300201.

7) Report: Sampling and Analysis Plan for CryoChem [sic] Site, Earl Township, PA, prepared by JACA Corp., 8/88. P. 300202-300342.

9) Letter to Mr. Christopher Pilla, U.S. EPA, from Mr. Philip S. Getty, JACA Corp., re: CryoChem(sic) residential well sampling program, 9/18/88. P. 300343-300345.

10) Letter to Mr. Christopher Pilla, U.S. EPA, from Dr. Albert C. Gray, JACA Corp., re: Monthly progress report, 9/9/88. P. 300346-300346.

11) Letter to Dr. Albert C. Gray, JACA Corp., from Mr. Christopher B. Pilla, U.S. EPA, re: Receipt of Cryochem Revised Quality Assurance Project Plan Phase I Residential Well Sampling Proposed Location and SAP Revision, 9/23/88. P. 300347-300366. Residential Sampling Results are attached.

12) Letter to Mr. Christopher B. Pilla, U.S. EPA, from Mr. Philip S. Getty, JACA Corp., re: CryoChem(sic) Remedial Investigation/Feasibility Study (RI/FS), 10/6/88. P. 300367-300370. The compiled data from the residential well questionnaire is attached.

13) Letter to Mr. Christopher Pilla, U.S. EPA, from Dr. Albert C. Gray, JACA Corp., re: Monthly progress report, 10/18/88. P. 300371-300372.

14) Letter to Mr. Christopher Pilla, U.S. EPA, from Mr. Michael A. Johnson, PRC Environmental Management, Inc., re: Activities during residential well split sampling, 10/26/88. P. 300373-300382. An Inorganic Traffic Report, an Organic Traffic Report, four Chain of Custody Records, and an EPA Sample Shipping Log are attached.

15) Letter to Mr. Christopher Pilla, U.S. EPA, from Dr. Albert C. Gray, JACA Corp., re: Monthly progress report, 11/15/88. P. 300383-300385. A data table is attached.

16) Letter to Dr. Albert C. Gray, JACA Corp., from Mr. Christopher B. Pilla, U.S. EPA, re: Residential well sample results, 11/18/88. P. 300386-300388.

17) Report: Preliminary Health Assessment for Cryochem, Inc., prepared by the Agency for Toxic Substances and Disease Registry (ATDSR), 12/2/88. P. 300389-300393.

18) Memorandum to Mr. Chris Pilla, U.S. EPA, from Ms. Michelle Fox, Roy F. Weston, Inc., re: Cryochem Groundwater Site Sampling Results, 12/2/88. P. 300394-300414. Sample results are attached.

19) Letter to Mr. Christopher Pilla, U.S. EPA, from Dr. Albert C. Gray, JACA Corp., re: Monthly progress report, 12/14/88. P. 300415-300416.

20) Report: Results of Phase I of Remedial Investigation Study for Cryochem Site, Earl Townsnip, PA, 12/88. P. 300417-300516.

21) Memorandum to Mr. Christoper [sic] Pilla, U.S. EPA, from Ms. Theresa A. Simpson, U.S. EPA, re: transmittal of the organic data review package, 1/4/88. P. 300517-300598. A memorandum regarding the organic data validation results and the organic data review package are attached.

22) Letter to Mr. Paul O'Lock from Mr. Christopher B. Pilla, U.S. EPA, re: Results of residential well sampling, 1/11/89. P. 300599-300600. A copy of the letter is attached.

23) Letter to Mr. Raymond Moyer from Mr. Christopher B. Pilla, U.S. EPA, re: Results of residential well sampling, 1/11/89. P. 300601-300602. A copy of the letter is attached.

24) Letter to Mr. Greg Breidegam from Mr. Christopher B. Pilla, U.S. EPA, re: Results of residential well sampling, 1/11/89. P. 300603-300604. A copy of the letter is attached.

25) Letter to Mr. Charles L. Byler from Mr. Christopher B. Pilla, U.S. EPA, re: Results of residential well sampling, 1/11/89. P. 300605-300606. A copy of the letter is attached.

26) Letter to Ms. Shelly Heimbach and Mr. Michael Hoffman from Mr. Christopher B. Pilla, U.S. EPA, re: Results of residential well sampling, 1/11/89. P. 300607-300608. A copy of the letter is attached.

27) Letter to Mr. Christopher Pilla, U.S. EPA, from Dr. Albert C. Gray, JACA Corp., re: Monthly progress report, 1/13/89. P. 300609-300610.

28) Memorandum to Mr. Christopher Pilla, U.S. EPA, from Ms. Theresa A. Simpson, U.S. EPA, re: transmittal of the inorganic data review package, 2/2/89. P. 300611-300627. A memorandum regarding the inorganic data validation results and the inorganic data review package are attached.

29) Letter to Mr. Christopher Pilla, U.S. EPA, from Dr. Albert C. Gray, JACA Corp., re: Monthly progress report, 2/13/89. P. 300628-300629.

30) Letter to Mr. Greg Breidegam from Mr. Christopher B. Pilla, U.S. EPA, re: Results of residential well sampling, 2/23/89. P. 300630-300634. A list of the parameters analyzed in residential wells and a fact sheet on lead are attached.

31) Letter to Mr. Charles Byler from Mr. Christopher B. Pilla, U.S. EPA, re: Results of residential well sampling, 2/23/89. P. 300665-300639. A list of the parameters analyzed in residential wells and a fact sheet on lead are attached.

32) Letter to Mr. Paul O'Lock from Mr. Christopher B. Pilla, U.S. EPA, re: Results of residential well sampling, 2/23/89. P. 300640-300644. A list of parameters analyzed in residential wells and a fact sheet on lead are attached.

33) Letter to Ms. Shelly Heimbach and Mr. Michael Hoffman from Mr. Christopher B. Pilla, U.S. EPA, re: Results of residential well sampling, 2/23/89. P. 300645-300649. A list of parameters analyzed in residential wells is attached.

34) Letter to The Selfinger Residence from Mr. Christopher B. Pilla, U.S. EPA, re: Results of residential well sampling, 2/23/89. P. 300650-300652. A list of parameters analyzed in residential wells is attached.

35) Letter to Mr. Paul Wills from Mr. Christopher B. Pilla, U.S. EPA, re: Results of residential well sampling, 2/23/89. P. 300653-300655. A list of parameters analyzed in residential wells is attached.

36) Letter to The Bowers Residence from Mr. Christopher B. Pilla, U.S. EPA, re: Results of residential well sampling, 2/23/89. P. 300656-300658. A list of parameters analyzed in residential wells is attached.

37) Letter to Mr. Raymond Moyer from Mr. Christopher B. Pilla, U.S. EPA, re: Results of residential well sampling, 2/23/89. P. 300659-300661. A list of parameters analyzed in residential wells is attached.

38) Letter to Mr. F. Daniel Miller from Mr. Christopher B. Pilla, U.S. EPA, re: Results of residential well sampling, 2/23/89. P. 300662-300666. A list of parameters analyzed in residential wells and a fact sheet on lead are attached.

39) Letter to Mr. Edward Schomley from Mr. Christopher B. Pilla, U.S. EPA, re: Results of residential well sampling, 2/23/89. P. 300667-300671. A list of parameters analyzed in residential wells and a fact sheet on lead are attached.

40) Letter to Mr. Winfield Keck from Mr. Christopher B. Pilla, U.S. EPA, re: Results of residential well sampling, 2/23/89. P. 300672-300674. A list of parameters analyzed in residential wells is attached.

41) Letter to Mr. John Tarins from Mr. Christopher B. Pilla, U.S. EPA, re: Results of residential well sampling, 2/23/89. P. 300675-300679. A list of parameters analyzed in residential wells and a fact sheet on lead are attached.

42) Letter to Mr. Bernard J. Yeager from Mr. Christopher B. Pilla, U.S. EPA, re: Results of residential well sampling, 2/23/89. P. 300680-300682. A list of parameters analyzed in residential wells is attached.

43) Letter to The Iezzi Residence from Mr. Christopher B. Pilla, U.S. EPA, re: Results of residential well sampling, 2/23/89. P. 300683-300685. A list of parameters analyzed in residential wells is attached.

44) Letter to Ms. Joan Gonzales from Mr. Christopher B. Pilla, U.S. EPA, re: Results of residential well sampling, 2/23/89. P. 300686-300689. A list of parameters analyzed in residential wells is attached.

45) Letter to Mr. Peter Riviello from Mr. Christopher B. Pilla, U.S. EPA, re: Results of residential well sampling, 2/23/89. P. 300690-300692. A list of parameters analyzed in residential wells is attached.

46) Letter to Mr. Linwood Reinert from Mr. Christopher B. Pilla, U.S. EPA, re: Results of residential well sampling, 2/23/89. P. 300693-300695. A list of parameters analyzed in residential wells is attached.

47) Letter to Mr. Claude Garber from Mr. Christopher B. Pilla, U.S. EPA, re: Results of residential well sampling, 2/23/89. P. 300696-300698. A list of parameters analyzed in residential wells is attached.

48) Letter to Mr. Peter Willing from Mr. Christopher B. Pilla, U.S. EPA, re: Results of residential well sampling, 2/23/89. P. 300699-300701. A list of parameters analyzed in residential wells is attached.

49) Letter to Mr. Theodore Hinaman from Mr. Christopher B. Pilla, U.S. EPA, re: Results of residential well sampling, 2/23/89. P. 300702-300704. A list of parameters analyzed in residential wells is attached.

50) Letter to Mr. Christopher Pilla, U.S. EPA, from Dr. Albert C. Gray, JACA Corp., re: Monthly progress reports, 3/13/89. P. 300705-300706.

51) Letter to Mr. Christopher Pilla, U.S. EPA, from Mr. Michael A. Johnson, PRC Environmental Management, Inc., re: Summary of unresolved RI/FS Issues, 3/20/89. P. 300707-300710.

52) Letter to Mr. and Mrs. John Drabinsky, re: Residential well sampling results, 3/23/89. P. 300711-300713. A memorandum regarding the residential water sample results is attached.

53) Analytical Results Summary Residential Well Sampling, 4/8/89. P. 300714-300725a.

54) Letter to Mr. Christopher Pilla, U.S. EPA, from Dr. Albert C. Gray, JACA Corp., re: Monthly progress reports, 4/14/89. P. 300726-300726.

55) Letter to Mr. Christopher Pilla, U.S. EPA, from Dr. Albert C. Gray, JACA Corp., re: Monthly progress reports, 5/15/89. P. 300727-300728.

56) Letter to Mr. Christopher Pilla, U.S. EPA, from Dr. Albert C. Gray, JACA Corp., re: Monthly progress reports, 5/15/89. P. 300729-300730.

57) Report: Cryochem Site Focused Feasibility Study for Alternate Water Supply, prepared by PRC Environmental Management, Inc., 6/30/89. P. 300731-300804.

IV. REMOVAL

1) Memorandum to Mr. James M. Seif, U.S. EPA, from Mr. Gerald D. Heston, U.S. EPA, and Mr. Charles Dispoto, U.S. EPA, re: CERCLA Funding Request for the Cryochem Groundwater Contamination Site, 9/16/87. P. 400001-400010. An enforcement status, analytical results and a site map are attached.

2) Memorandum to Dr. J. Winston Porter, U.S. EPA, from Mr. James M. Seif, U.S. EPA, re: Justification for Approval of a Removal Action at the Cryochem Groundwater Contamination Site, 9/16/87. P. 400011-400011.

3) Memorandum to Dr. J. Winston Porter, U.S. EPA, from Mr. James M. Seif, U.S. EPA, re: transmittal of the CERCLA request for a 12-month exemption, 11/10/88. P. 400012-400016. The CERCLA request is attached.

4) Pollution Report #1, 8/17/87. P. 400017-400018.

5) Pollution Report #2, 9/3/87. P. 400019-400019.

6) Pollution Report #3, 9/4/87. P. 400020-400020.

7) Pollution Report #4, 9/4/87. P. 400021-400022.

8) Pollution Report #5, 9/8/87. P. 400023-400023.

9) Pollution Report #6, 9/21/87. P. 400024-400024.

10) Pollution Report #7, 9/25/87. P. 400025-400026.

11) Pollution Report #8, 9/25/87. P. 400027-400027.

12) Pollution Report #9, 10/2/89. P. 400028-400029.

13) Pollution Report #10, 10/9/87. P. 400030-400031.

14) Pollution Report #11, 11/11/87. P. 400032-400033.

15) Pollution Report #12, 11/12/87. P. 400034-400035.

16) Pollution Report #13, 12/4/87. P. 400036-400037.

17) Pollution Report #14, 1/28/88. P. 400038-400039.

V. COMMUNITY INVOLVEMENT/CONGRESSIONAL CORRESPONDENCE/IMAGERY

1) A list of residences with EPA installed carbon filtration systems (no author cited), (undated). P. 500001-500001.

GENERAL GUIDANCE DOCUMENTS *

1) "Promulgation of Sites from Updates 1-4," Federal Register, dated 6/10/86.

2) "Proposal of Update 4," Federal Register, dated 9/18/85.

3) Memorandum to U. S. EPA from Mr. Gene Lucero regarding community relations at Superfund Enforcement sites, dated 8/28/85.

4) Groundwater Contamination and Protection, undated by Mr. Donald V. Feliciano on 8/28/85.

5) Memorandum to Toxic Waste Management Division Directors Regions I-X from Mr. William Hedeman and Mr. Gene Lucero re: Policy on Floodplains and Wetlands Assessments for CERCLA Actions, 8/6/85.

6) Guidance on Remedial Investigations under CERCLA, dated 6/85.

7) Guidance on Feasibility Studies under CERCLA, dated 6/85.

8) "Proposal of Update 3," Federal Register, dated 4/10/85.

9) Memorandum to Mr. Jack McGraw entitled "Community Relations Activites at Superfund Sites - Interim Guidance," dated 3/22/85.

10) "Proposal of Update 2," Federal Register, dated 10/15/84

11) EPA Groundwater Protection Strategy, dated 9/84.

12) Memorandum to U.S. EPA from Mr. William Heckman, Jr. entitled "Transmittal at Superfund Removal Procedures - Revision 2," dated 8/20/84.

13) "Proposal of Update 1," Federal Register, dated 9/8/83.

14) Community Relations in Superfund: A Handbook (interim version), dated 9/83.

15) "Proposal of First National Priority List," Federal Register, dated 12/30/82.

16) "Expanded Eligibility List," Federal Register, dated 7/23/82.

17) "Interim Priorities List," Federal Register, dated 10/23/81.

18) Uncontrolled Hazardous Waste Site Ranking System: A User's Manual (undated).

19) Field Standard Operating Procedures - Air Surveillance (undated).

20) Field Standard Operating Procedures - Site Safety Plan (undated).

* Located in EPA Region III office.

APPENDIX D

LETTER OF CONCURRENCE FROM
COMMONWEALTH OF PENNSYLVANIA

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
Post Office Box 2063
Harrisburg, Pennsylvania 17120

Deputy Secretary for
Environmental Protection

717-787-5028

September 29, 1989

RECEIVED

OCT 06 1989

EPA, REGION III
OFFICE OF REGIONAL ADMINISTRATOR

Mr. Edwin B. Erickson
Regional Administrator
USEPA Region III
841 Chestnut Building
Philadelphia, PA 19107

Re: CryoChem Superfund Site
Operable Unit 1, Alternative Water Supply
draft Record Of Decision (ROD)

Dear Mr. Erickson:

The draft Record of Decision (as received September 19, 1989) for the CryoChem site, Operable Unit 1, has been reviewed by the Department. It is my understanding that this Record of Decision will be submitted to you for your approval.

The proposed remedy for the Operable Unit 1, Alternative Water Supply, would include the installation of carbon treatment units as an interim measure, and construction of a permanent replacement water supply system for the affected area (20-30 homes).

I hereby concur with the EPA's proposed remedy, with the following conditions:

* EPA will assure that the Department is provided an opportunity to fully participate in any negotiations with responsible parties.

* The Department will be given the opportunity to concur with decisions related to the design of the remedial action, to assure compliance with DER design specific ARARs.

* The Department's position is that its design standards are ARARs pursuant to SARA Section 121, and we will reserve our right to enforce those design standards.

* The Department will reserve our right and responsibility to take independent enforcement actions pursuant to state and federal law.

* This concurrence with the selected remedial action is not intended to provide any assurances pursuant to SARA Section 104(c)(3).

If you have any questions regarding this matter please do not hesitate to contact me.

Sincerely,

Mark M. McClellan
Deputy Secretary